NEC

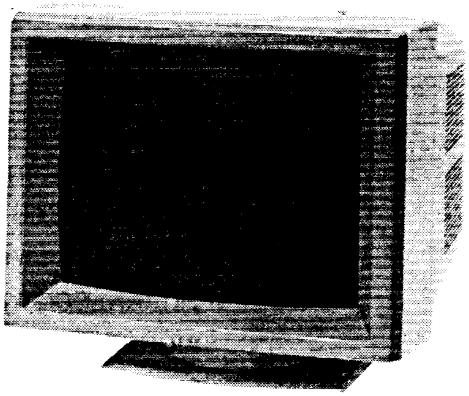
MODELS JC-1401P3E/EE/R

MULTISYNC COLOR MONITOR

SERVICE MANUAL

PART NO.599910250

Better Service
Better Reputation
Better Profit



SPECIFICATIONS

A. Electrical Description

Picture Tube	370HYB22 13 Visual inches diagonal 90 degree deflection, 0.31 mm Trio dot pitch Dot type black matrix, Non-long persistence phosphor, Dark bulb, Direct etch
Input Signal	Video : TTL Level Positive : ANALOG 0.6Vp-p/75Ω Positive Sync. : Separate sync. TTL Level Horizontal sync. Positive/Negative Vertical sync. Positive/Negative : Composite sync. TTL Level Positive/Negative : Composite sync. on Green Video sync. 0.3 Vp-p Negative (Video 0.6 Vp-p Positive)
Display Colors	TTL Input : 8/16/64 colors Analog Input : Unlimited colors
Synchronization	Horizontal : 15.5 KHz to 35 KHz (Automatically) Vertical : 56 Hz to 62 Hz (Manual), Non-interlace
Resolution	Horizontal : 800 dots Vertical : 560 lines
Video Band Width	30 MHz
Maximum Display Area	Horizontal : 250mm Vertical : 180mm

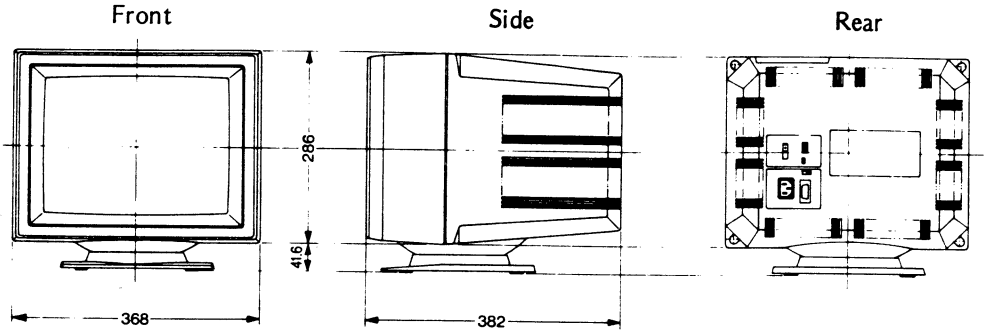
Misconvergence	Less than 0.6mm		
Power Supply	AC 220-240 V, 50/60 Hz		
Power Consumption	78 W		
Environmental Considerations	Operating	Temperature	0°C to +40°C
		Humidity	30% to 80%
	Storage	Temperature	−20°C to +60°C
		Humidity	10% to 90%

NOTE: The above specifications are subject to change without notice for further improvement.

NEC Corporation
TOKYO, JAPAN

B. Mechanical Description (See below diagrams)

1. Cabinet: Molded plastic cabinet with attachable tilt swivel base.
2. Dimensions: 368(W) x 327.6(H) x 382(D) mm
3. Weight: 15.2 kg



4. Controls

Rear Controls:
- POWER SWITCH
- MANUAL SWITCH
- COLOR SWITCH
- TEXT COLOR SWITCH
- TTL/ANALOG SWITCH

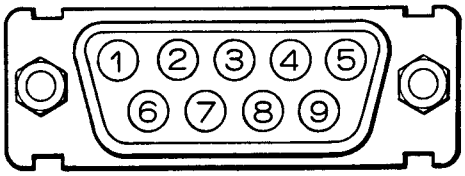
Top Controls:
- BRIGHT. CONTROL
- CONTRAST CONTROL
- V. SIZE CONTROL
- V. POSITION CONTROL
- V. HOLD CONTROL
- H. POSITION CONTROL
- TEXT SWITCH
- H. WIDTH SWITCH

5. Input Signal Terminal: 9 PIN D-SUB CONNECTOR (FEMALE)
(SEE PAGE 2 FOR PIN ASSIGNMENTS)

NOTE: Power cord: Plug form different by model.
JC-1401P3EE
Warning: This apparatus must be earthed.
Important
The wires in this mains lead are colored in accordance with following code:

PIN ASSIGNMENTS AND SIGNAL LEVELS

D-SUB Type 9P



PIN ASSIGNMENT OF IBM GRAPHICS ADAPTER

IBM ADAPTERS / PIN-ASSIGNMENT	COLOR GRAPHICS TTL 16 COLORS	ENHANCED GRAPHICS TTL 64/16 COLORS	PROFESSIONAL GRAPHICS ANALOG
1	GROUND	GROUND	* RED
2	GROUND	SECONDARY RED	* GREEN
3	RED	PRIMARY RED	* BLUE
4	GREEN	PRIMARY GREEN	COMPOSITE SYNC.
5	BLUE	PRIMARY BLUE	MODE CONTROL
6	INTENSITY	SECONDARY GREEN /INTENSITY	RED GROUND
7	NON-CONNECTION	SECONDARY BLUE	GREEN GROUND
8	HORIZONTAL SYNC.	HORIZONTAL SYNC.	BLUE GROUND
9	VERTICAL SYNC.	VERTICAL SYNC.	GROUND

PIN ASSIGNMENT OF OTHER COMPUTERS

SIGNAL / PIN-ASSIGNMENT	TTL			ANALOG		
	8 COLORS	16 COLORS	64 COLORS	SEPARATE SYNC.	COMPOSITE SYNC.	SYNC. ON GREEN
1	GROUND			* RED		
2	——		SECONDARY RED	* GREEN		GREEN ◎ H/V SYNC.
3	RED		PRIMARY RED	* BLUE		
4	GREEN		PRIMARY GREEN	H. SYNC.	H/V SYNC.	——
5	BLUE		PRIMARY BLUE	V. SYNC.	——	
6	——	INTENSITY	SECONDARY GREEN	GROUND		
7	——		SECONDARY BLUE			
8	H. SYNC./H/V SYNC.					
9	V. SYNC.					

"——" means GROUND or NON-CONNECTION

SIGNAL LEVEL

All signal levels, except for those listed below, are TTL.

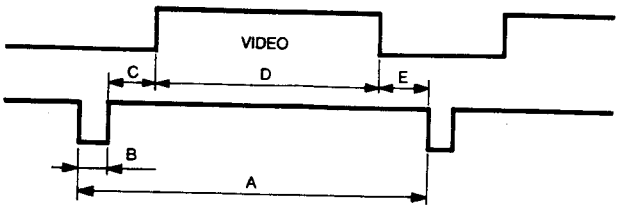
"*" means 0.6 Vp-p (VIDEO)

"◎" means 0.6 Vp-p (VIDEO), 0.3 Vp-p (SYNC.)

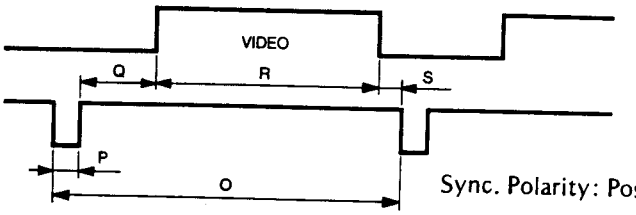
TIMING CHART

SEPARATE SYNC.

HORIZONTAL



VERTICAL



Sync. Polarity: Positive/Negative

	f_H	EXAMPLE TIMING			REMARKS
		15.75kHz	24.83kHz	30.1kHz	
Horizontal	$A_{\mu s}$	63.5	40.28	33.2	64.5 to 28.6μs (15.5 to 35kHz)
	$B_{\mu s}$	5.08	3.04	3.43	2 to 10μs
	$C_{\mu s}$	7.62	2.80	2.86	2 to 8μs
	$D_{\mu s}$	46.3	32.4	25.76	20 to 48μs *
	$E_{\mu s}$	4.4	2.04	1.14	1 to 6μs and E/(B + C) = 0.1 to 0.45 Range 1: E/(B+C) = 0.3 to 0.5
Vertical	O_{mS}	16.6	17.72	17.66	16.1 to 17.8 mS (56 to 62Hz)
	P_{mS}	0.26	0.32	0.26	0.05 to 0.7 mS
	Q_{mS}	1.6	1.01	0.73	0.08 to 2.2 mS
	R_{mS}	13.84	16.11	16.6	12 to 17 mS and (O – R) = 0.8 to 4.0
	S_{mS}	0.9	0.28	0.066	0 to 1.6 mS and Q = [(O–R)–0.8]/2 ±0.2

Range 1: A = 64.5 to 50μs
Range 2: A = 50 to 37μs
Range 3: A = 37 to 28.6μs

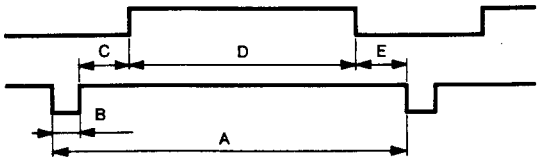
* Both SEPARATE SYNC. & COMPOSITE SYNC.
Range 1: D/A = 0.7~0.75
Range 2: D/A = 0.8~0.85
Range 3: D/A = 0.75~0.8

PRESET TIMING

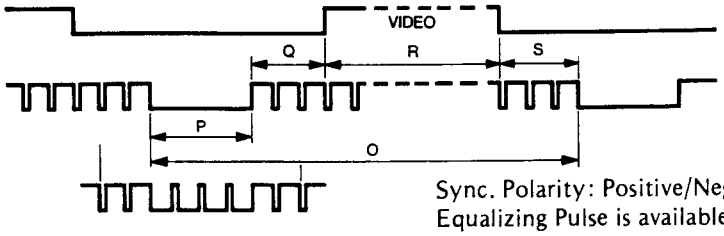
Horizontal					Vertical				
	f_H	15.8kHz	22kHz	30.5kHz		f_H	15.8kHz	22kHz	30.5kHz
	$A_{\mu s}$	63	45.5	33		O_{mS}	16.4	16.68	16.6
	$B_{\mu s}$	4.2	4.9	4.5		P_{mS}	0.075	0.6	0.07
	$C_{\mu s}$	7.2	1.6	2.8		Q_{mS}	1.525	0.08	2.12
	$D_{\mu s}$	45	39	25.6		R_{mS}	12.6	16	13.05
	$E_{\mu s}$	6.6	0	0.1		S_{mS}	2.2	0	1.36

COMPOSITE SYNC.

HORIZONTAL



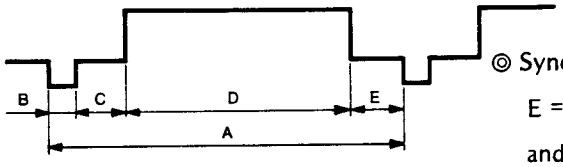
VERTICAL



Sync. Polarity: Positive/Negative
Equalizing Pulse is available.

Composite Sync. & Video (Sync. on Green)

HORIZONTAL

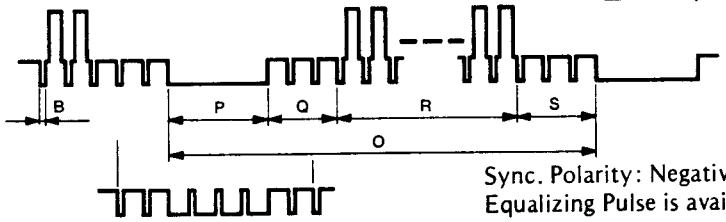


◎ Sync. on G:

$$E = \frac{A-(D+B) \pm (5-B)}{2}$$

and $2 \leq B \leq 5\mu S$

VERTICAL



Sync. Polarity: Negative
Equalizing Pulse is available.

	f_H	EXAMPLE TIMING			REMARKS
		15.98kHz	25.5kHz	31.5kHz	
Horizontal	$A_{\mu s}$	62.6	39.2	31.75	64.5 to 28.6μs (15.5 to 35kHz)
	$B_{\mu s}$	5.41	2.51	2.06	2 to 10μs
	$C_{\mu s}$	8.0	3.30	3.62	3.3 to 8μs
	$D_{\mu s}$	44.7	32.14	24.52	20 to 48μs *
	$E_{\mu s}$	4.47	1.25	1.56	1 to 6μs and E/(B + C) = 0.1 to 0.45 Range 1 : E/(B+C) = 0.3 to 0.5 ◎
Vertical	O_{mS}	16.35	16.67	16.67	16.1 to 17.8 mS (56 to 62Hz)
	P_{mS}	0.19	0.12	0.19	0.05 to 0.19 mS
	Q_{mS}	1.82	0.80	1.02	0.8 to 2.2 mS
	R_{mS}	13.47	15.63	15.24	12 to 17 mS and (O − R) = 0.8 to 4.0
	S_{mS}	0.87	0.12	0.22	0 to 1.6 mS and Q=[(O−R)−0.8]/2±0.2

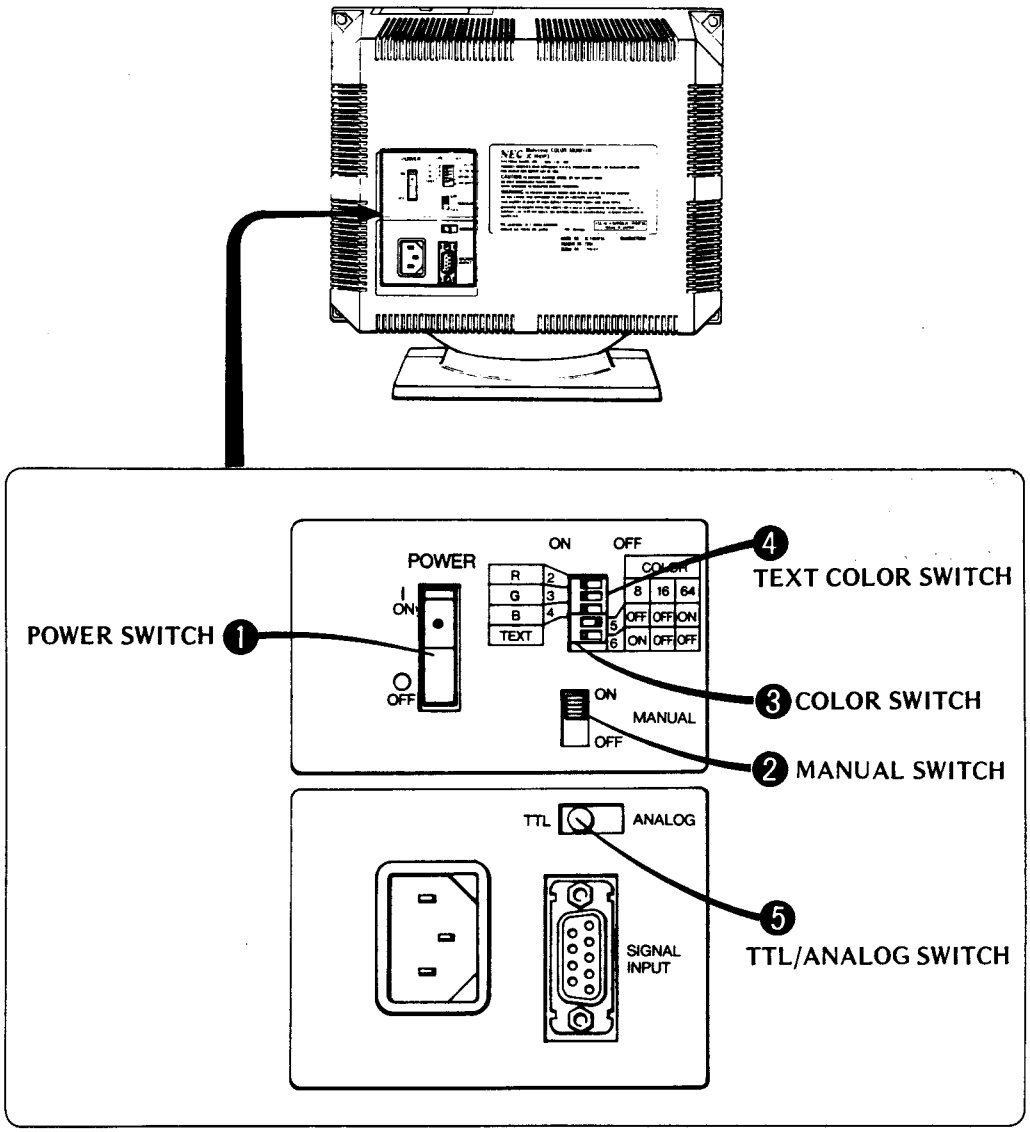
GENERAL

MultiSync, The Inteligent Monitor, is a high resolution color monitor that automatically adjusts to graphics board scanning frequencies from 15.5 KHz to 35 KHz.
MultiSync gives IBM PC, PC/XT, and PC/AT users crisp text and vivid color graphics displays when used with any of the three IBM graphics adapters (the CGA, EGA or PGA)
MultiSync can also be used with other IBM compatible graphics adapters to provide IBM users with the widest range of color monitor compatibility and capability available in the market place.

FEATURES

- MultiSync automatically scans all frequencies between 15.5 KHz and 35 KHz.
- MultiSync is compatible with the IBM PC, PC/XT, PC/AT and look-alikes.
- MultiSync is compatible with the IBM Professional Graphics Adapter, the IBM Enhanced Graphics Adapter, the IBM Color Graphics Adapter and other IBM compatible graphics adapters.
- MultiSync's wide compatibility makes it possible to upgrade boards or software without purchasing a new monitor.
- MultiSync has a maximum horizontal resolution of 800 dots and a maximum vertical resolution of 560 lines for superior clarity of display.
- MultiSync offers both TTL and ANALOG signal inputs, and in the ANALOG mode can display an unlimited palette of colors depending on the graphics board and software being used.
- MultiSync features a TEXT SWITCH with a choice of seven colors (red, blue, green, cyan, yellow, white and magenta) displaying word processing, spread sheets, databases or other software in crisp alphanumeric text on a dark-bulb black background.
- MultiSync has a 14 inch diagonal display and a large, 13 inch viewing area.

ADJUSTING THE REAR CONTROLS



❶ POWER SWITCH

Used to turn the power ON or OFF. When the power is ON, the power indicator is lit.

❷ MANUAL SWITCH

This switch selects either the IBM mode when OFF or the manual mode when ON.

When this switch is OFF, MultiSync automatically works in the IBM mode and adjusts itself to the scanning frequency, resolution and color requirements of the IBM compatible graphics adapter being used.

When this switch is ON, the user must manually select the number of colors (8/16/64) needed by the graphics adapter being used with the COLOR SWITCH (see No. ❸ below). Refer to instructions accompanying the graphics adapter being used for information on how many colors the adapter can display.

❸ COLOR SWITCH

The three color configurations (8/16/64 colors) necessary when using non-IBM compatible graphics adapters can be set using No. 5 and 6 of the dip switches as shown below. Refer to instructions accompanying the graphics adapter being used for information on how many colors the adapter can display.

COLOR MODE	DIP SWITCH	
	No. 5	No. 6
8 colors	OFF	ON
16 colors	OFF	OFF
64 colors	ON	OFF
UNUSED	ON	ON

NOTE

These switches should be set correctly in relation to the input signal of the graphics adapt. being used. Refer to instructions accompanying the graphics adapter for information on the input signal and refer to No.❺ below.

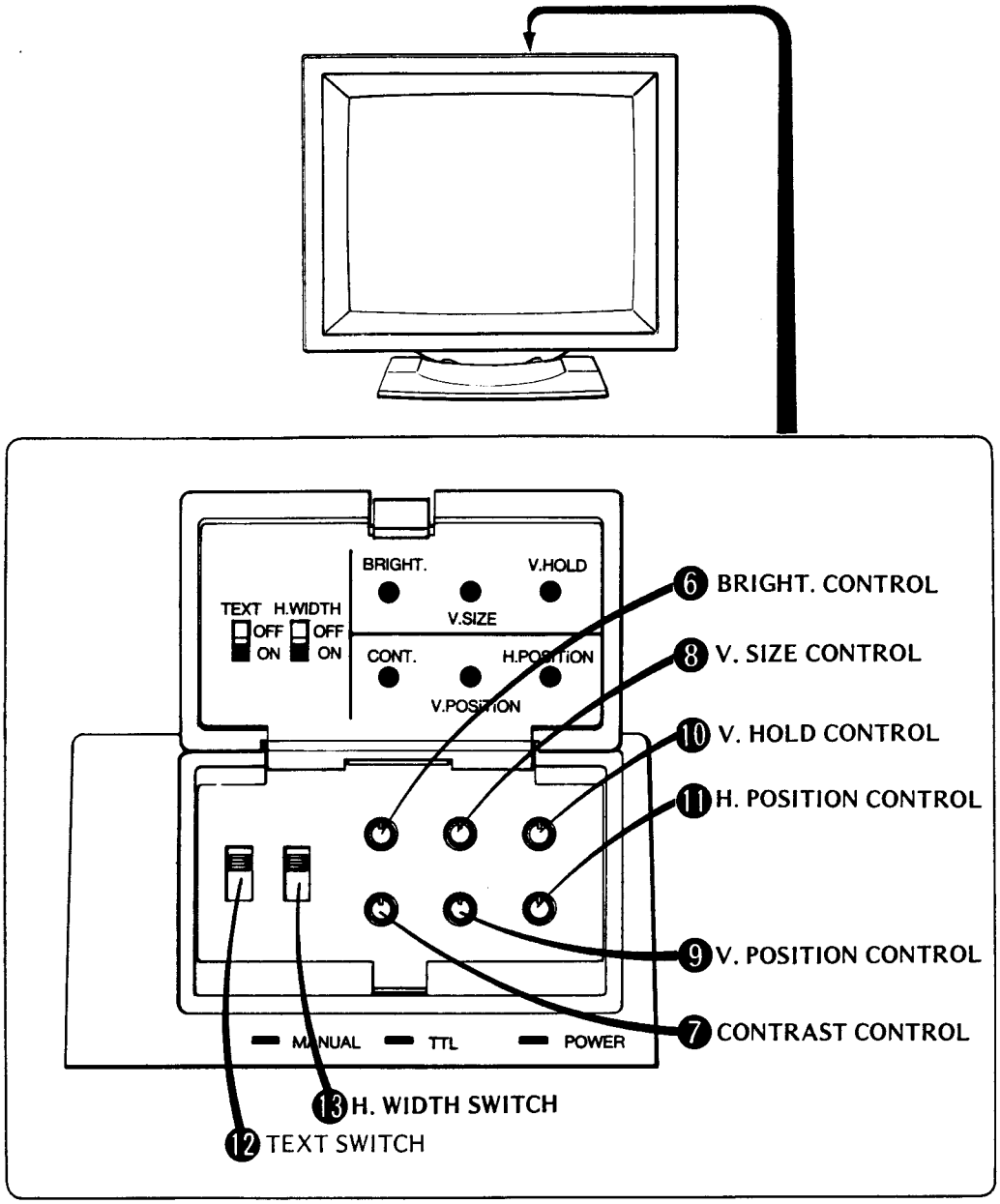
❹ TEXT COLOR SWITCH

Refer to No.⓬ TEXT SWITCH for full information on using the TEXT SWITCH.

❺ TTL/ANALOG SWITCH

Used to select an input video signal – either TTL or ANALOG – of the graphics adapter. It is important to determine whether the input signal of the graphics adapter being used is ANALOG or TTL prior to connecting the adapter with your personal computer. Refer to instructions accompanying the graphics adapter for information on the input signal.

ADJUSTING THE TOP CONTROLS



6 BRIGHT. CONTROL

Used to adjust the picture brightness of the screen.

7 CONTRAST CONTROL

Adjusts the display to the contrast preferred by the user.

❽ V. SIZE CONTROL

Turn this knob for the proper vertical size of the display. Turn the knob clockwise for a larger display; turn it counterclockwise for a smaller display.

❾ V. POSITION CONTROL

Turn this knob for the proper vertical position of the display. Turn the knob clockwise for a lower display position; turn it counterclockwise for a higher display position.

❿ V. HOLD CONTROL

Adjusts the vertical stability of the display. Please adjust the V. HOLD CONTROL so that CONTROL position is center of the hold range for proper picture.

⓫ H. POSITION CONTROL

Turn this knob for the proper horizontal position of the display. Turn the knob clockwise to reposition display to the right; turn it counterclockwise to reposition to the left.

⓬ TEXT SWITCH

This switch controls the text mode of MultiSync.

When it is ON, the text of the display will appear in one color selected by the TEXT COLOR SWITCH (No. 2, 3 and 4 of the dip switch on the rear of MultiSync), regardless of the colors of the software program being used.

When it is OFF, the color of the software program being used will again be displayed.

The diagram below of the dip switches shows how to display text in your choice of seven colors.

TEXT COLOR	DIP SWITCH		
	2 R	3 G	4 B
RED	ON	OFF	OFF
GREEN	OFF	ON	OFF
BLUE	OFF	OFF	ON
YELLOW	ON	ON	OFF
CYAN	OFF	ON	ON
MAGENTA	ON	OFF	ON
WHITE	ON	ON	ON

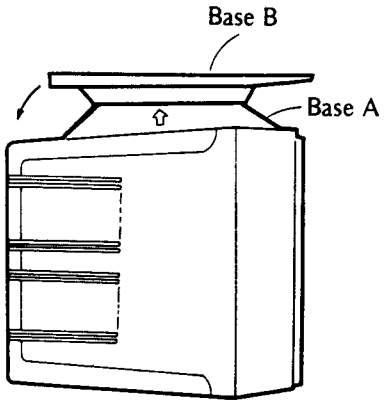
NOTE

The text switch works only in the TTL mode.

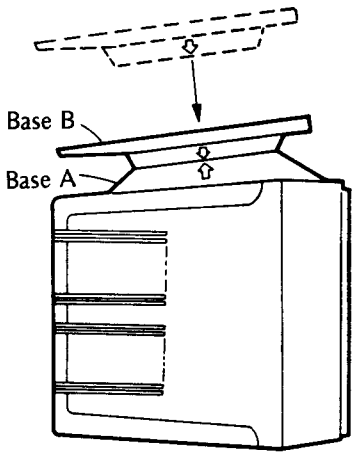
⓭ H. WIDTH SWITCH

Adjust this switch for the horizontal size of display preferred. When this switch is ON, the width of the display size changes.

THE METHOD FOR REMOVING AND MOUNTING THE TILT SWIVEL BASE

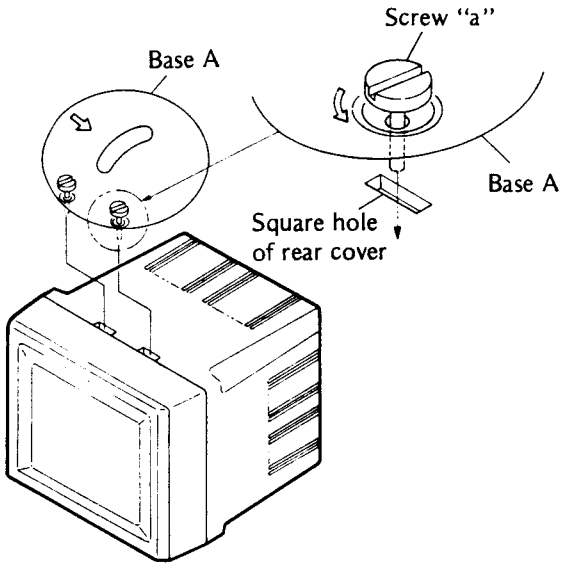


1. Push base "B" in the direction of the arrow as shown in the figure on the lift.



2. Turn base "B" through and align marks "⇧" on base "A" and base "B".

3. Remove base "B" from base "A".



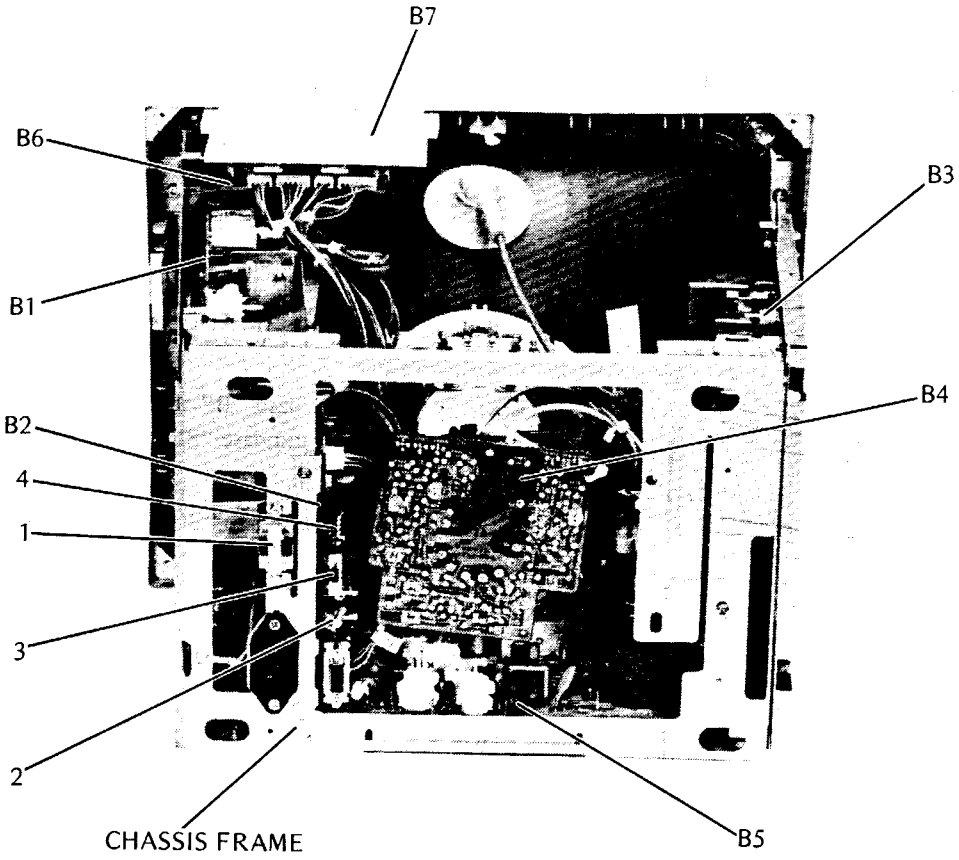
4. Remove the two screws "a" and lift up base "A" from the display.

NOTE

- To mount the tilt swivel bases, follow the removing procedure in the reverse order.
- When turning the display upright care showld be taken so as not to jolt or damage etc.

PART LOCATIONS

BOARD LAYOUT



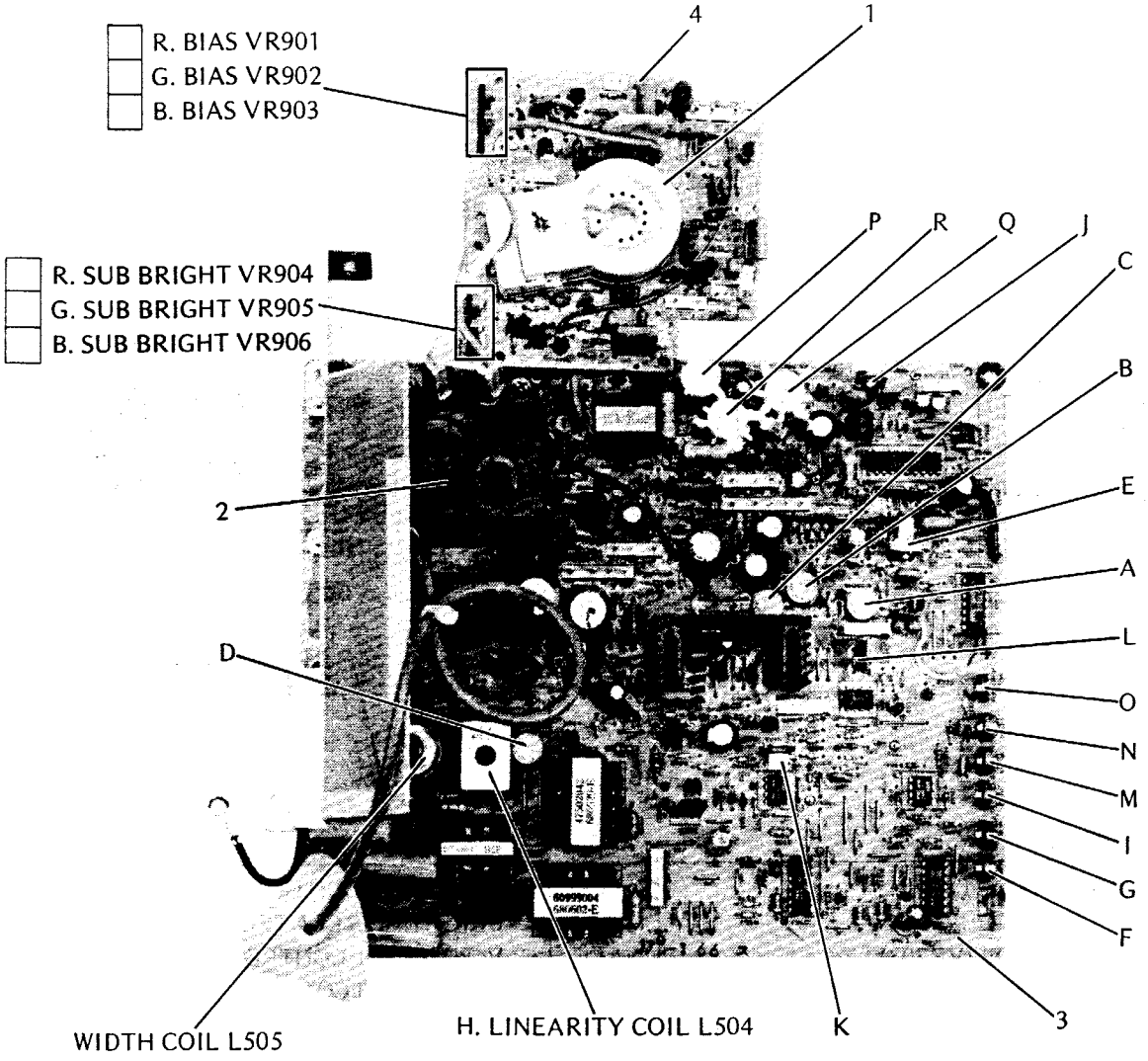
BOARDS

B1	SWITCHING REGULATOR POWER SUPPLY BOARD	PWE 142
B2	INTERFACE BOARD	PWE 110
B3	VIDEO BOARD	PWE 147
B4	CRT BOARD	PWE 123
B5	DEFLECTION BOARD	PWE 150
B6	CONTROL BOARD	PWE 125A
B7	LED BOARD	PWE 125B

USER CONTROLS

1	POWER SWITCH
2	TTL/ANALOG SWITCH
3	MANUAL SWITCH
4	TEXT COLOR SWITCH

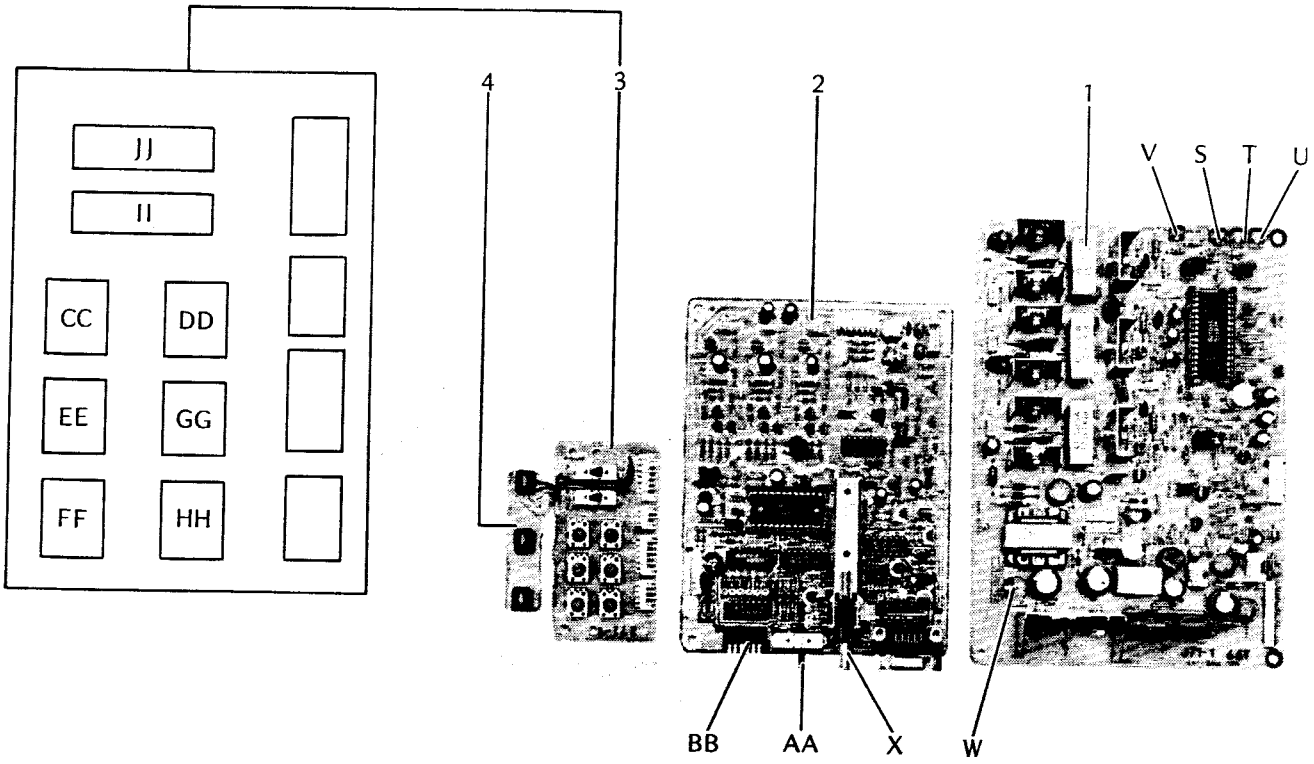
1	CRT SOCKET	
2	FLYBACK TRANSFORMER	
3	DEFLECTION BOARD	PWE 150
4	CRT BOARD	PWE 123



ADJUSTMENT CONTROLS

A	V. LINEARITY (2) (VR401)	K	+16V ADJUST (VR551)
B	V. LINEARITY (1) (VR402)	L	F.V ADJUST (VR552)
C	SUB. HEIGHT (1) (VR403)	M	SUB. H CENTER (2) (VR553)
D	SIZE PIN-CUSION (VR404)	N	SUB. H CENTER (3) (VR554)
E	V. BIAS (VR405)	O	H. HOLD (2) (VR555)
F	V. MODE (VR451)	P	H. V. ADJUST (VR2001)
G	SUB. HEIGHT (2) (VR452)	Q	H. V. PROTECTER (1) (VR2002)
I	SUB. H. CENTER (1) (VR501)	R	H. V. PROTECTER (2) (VR2003)
J	H. HOLD (1) (VR502)		

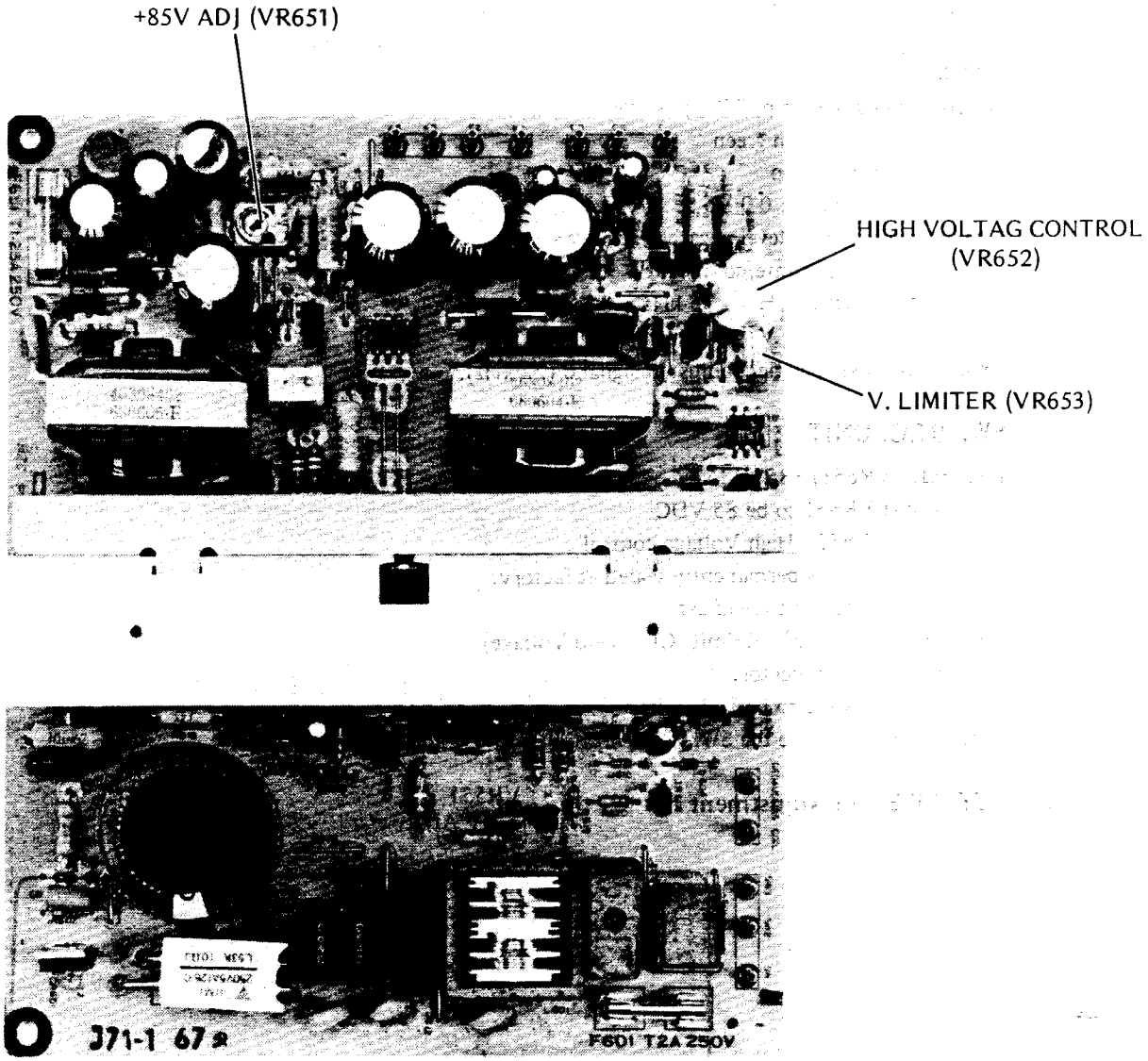
1	VIDEO BOARD	PWE 147
2	INTERFACE BOARD	PWE 110
3	CONTROL BOARD	PWE 125A
4	LED BOARD	PWE 125B



ADJUSTMENT CONTROLS

S	R. GAIN CONTROL (VR701)	CC	CONTRAST CONTROL (VR1)
T	G. GAIN CONTROL (VR702)	DD	BRIGHTNESS CONTROL (VR2)
U	B. GAIN CONTROL (VR703)	EE	V. POSITION CONTROL (VR3)
V	SUB CONTRAST CONTROL (VR704)	FF	H. POSITION CONTROL (VR5)
W	+6V ADJUST CONTROL (VR705)	GG	V. SIZE CONTROL (VR4)
X	TTL/ANALOG SWITCH (SW801)	HH	V. HOLD CONTROL (VR6)
AA	MANUAL SWITCH (SW802)	II	H. WIDTH SWITCH
BB	TEXT COLOR/SWITCH (SW803 NO. 2, 3, 4)	JJ	TEXT SWITCH
BB	COLOR SWITCH (SW803 NO. 5, 6)		

SW. REG. PWB LAYOUT



ALIGNMENT PROCEDURE

Adjustment conditions and Precautions

1. Power supply voltage: AC 220 ~ 240 V, 50/60 Hz
2. Warm up time
   The display must be on for at least 20 minutes before starting alignments.
   This is especially critical in color temperature and white balance adjustments.
3. Signals
   Video: Analog 0.6 Vp-p, 75Ω, positive
   analog sync. on green
   video: 0.6 Vp-p
   synchronizing: 0.3 Vp-p
   Synchronizing: TTL level negative/positive
   separate/composite
   Scanning Frequency: H 15 kHz ~ 35 kHz
   V 50 ~ 60 Hz
   Unless otherwise specified, adjust at signal 6 (22 kHz).

1. SW. REG. UNIT

1-1. $+B_1$ (VR651) +85V LINE
Adjust VR651 to be 85 VDC

1-2. $+B_H$ (VR652) High Voltage control
This control is permanently sealed at factory.
Do not attempt to readjust.

1-3. $+B_{LIM}$ (VR653) V. limit (C1 – Gnd Voltage)
Remove C-connector.
Adjust VR653 to be 122 Volts.

Note: Do not operate the SW. Reg. unit itself without any load.

2. DEF PWB Pre-Adjustment

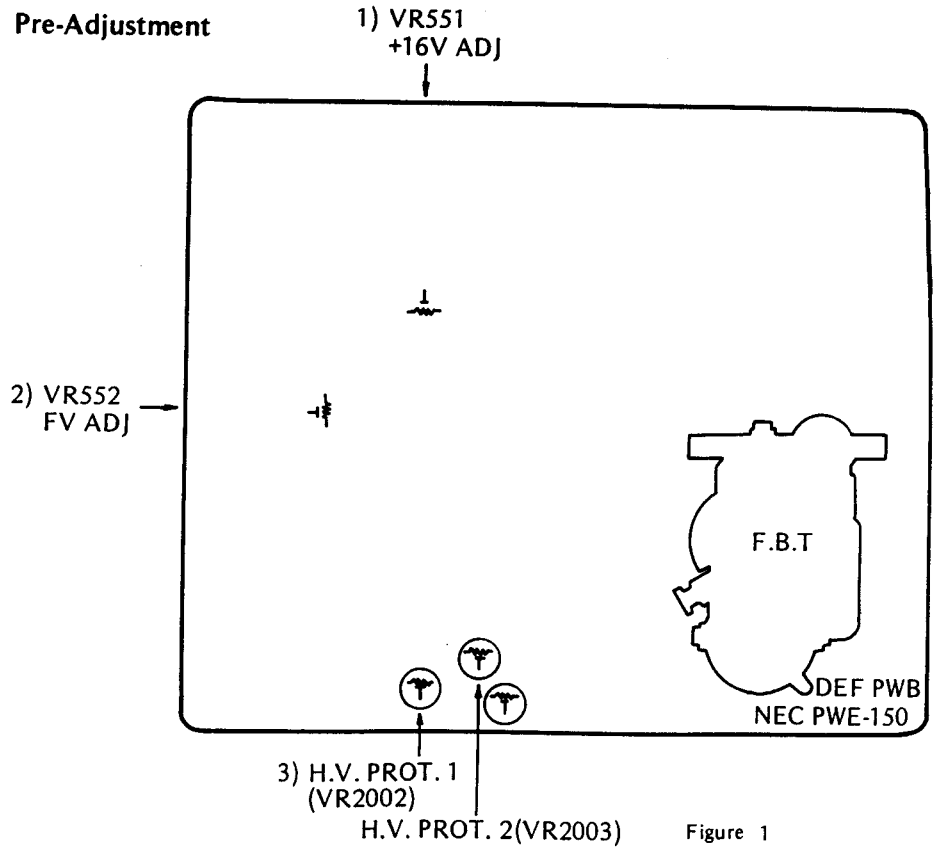


Figure 1

Remove K and C connectors, and Apply 24V DC between K2 and K3.
Or just only remove C connector.

(1) +16V adjustment
Adjust TP551-GND to 16V±0.05V DC. (VR551)

(2) Receive signal 1 and adjust VR552 so that the voltage between TP552 and Gnd is 10±0.05V DC.

(3) H.V. Protector
The high Voltage protector control 1 (VR2002) and control 2 (VR2003) are permanently sealed at factory.
Do not attempt to readjust!

3. Video PWB pre-Adjustment

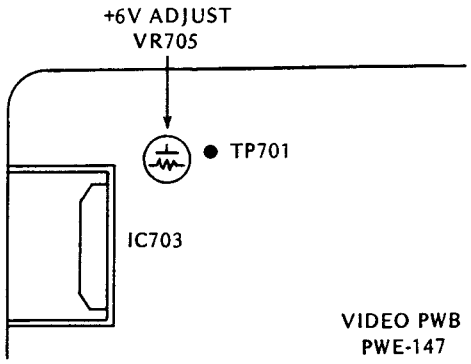


Figure 2

(1) +6V adjustment
Adjust VR705 so that the voltage between TP701 and GND is 6V±0.05V DC.

4. Main Adjustments

Unless otherwise specified, adjust the controls on the control PWB as shown below:

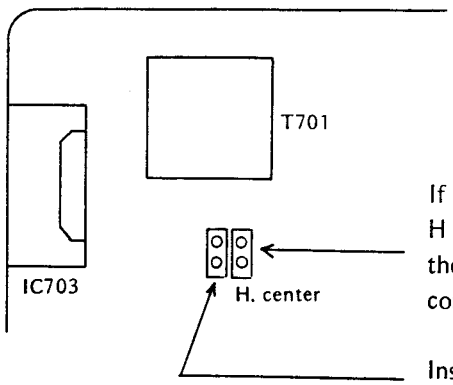
VR1 Contrast : Max. (fully clockwide)
VR2 Brightness: So that no background raster appears
VR3 V. position: Center
VR4 H. position: Center
VR5 V. size: Center
VR6 V. hold: Proper position

SW2 H. size: OFF
SW3 TEXT SW: OFF

Focus control: Adjust for the optimum picture.

4-1) Adjustment of H. raster centering

Turn the brightness control fully clockwise so that background raster can be seen, then connect the H connector in the position so that the background raster is in the center of the CRT screen.



If the raster is off to one side, insert the H connector here (adjust to one side or the other by changing the direction of the connector).

Insert here if raster centering correction is not needed.

Video PWB component side

Figure 3

NOTE: Due to overscan, it is impossible to center the background raster if the horizontal frequency is between 15 kHz and 20 kHz.

4-2)

(1) H. hold
   a) Short between TP501 and GND.
   b) Apply signal 3 (30 kHz) and adjust H. hold (1) VR502 so that the entire picture appears.
   c) Apply signal 2 (20 kHz) and adjust H. hold (2) VR555 so that the entire picture appears.

(2) H.V. ADJ (VR2001)
   The H.V. ADJ (VR2001) is permanently sealed at factory.
   Do not attempt to readjust.

(3) H. linearity
   Adjust L504 for the optimum H. linearity. If at this time the picture is horizontally mispositioned, it is possible to adjust VR4 to center it, but after adjustment of the linearity set VR4 to the mechanical center.

(4) H. position (adjust to the center of the raster)
   a) Adjust sub H. center 1 VR501 to center the picture when signal 3 (30.48 kHz) is applied.
   b) Adjust sub H. center 3 VR554 to center the picture (1 mm to the left) when signal 6 (22 kHz) is input for mutuality between actual EGA timing and test timing.
   c) Adjust sub H. center 2 VR553 to center the picture when signal 5 (15.75 kHz) is applied.
   d) Check that the picture is centered when the signals in a), b), and c) above are applied.
   NOTE: Adjust in the order a) → b) → c)

(5) Side pincushion
   Adjust VR404 for the optimum side pincushion distortion.
   Be careful that there is no barrel distortion.

(6) H. width
Adjust H. width L505 so that the size of the picture when signal 6 (22 kHz) is applies is 250mm. Perform this adjustment with the H. wide switch SW2 OFF. If the size cannot be adjusted to 250mm even if H. width L505 is turned fully, turn L504 slightly to correct this.

(7) V. position
Vertically center the picture when adjustment signal 6 (22 kHz) is applies (VR3, V. POSITION)

(8) V. linearity
Adjust VR401 and VR402 so that vertical linearity is optimum when signal 6 (22 kHz) is applies.

(9) V. size
a) Adjust sub height (1) VR403 so that the vertical amplitude is 180mm when signal 3 (30.48 kHz) is applies is 180 mm.
b) Adjust sub height (2) VR452 so that the vertical amplitude when signal 5 (15.75kHz) is applies is 180 mm.
c) Adjust V-mode VR451 so that the vertical amplitude is 180 mm when V-mode signal 4 (30.48 kHz, 400 lines) is applies.
Set the MANUAL switch to the OFF (PRE-SET mode) when performing this adjustment.
Also V-mode (Input pin #5) should be low.
d) Applies the signals in above steps a), b), and c) and check that the vertical amplitude for each is 180 mm±2 mm. If readjustment is necessary, start from step a) and proceed in order.

(10) V. bias
Adjust VR405 so that the voltage between DY4 and GND is 12.0 VDC when signal 6 (22kHz) is applies.

4-3) Adjustment of video amplitude and white balance

NOTE: Before performing this adjustment, check that the video signals are as follows:
Be sure to set the TTL/ANALOG SW to ANALOG position.
Video: analog 0.6 Vp-p
Synchronizing: separate TTL level
Unless otherwise specified, use signal 8 for the adjustments.

(1) Initial setting of adjustment VR

VR701 ~ 703 GAIN control	Fully counterclockwise
VR704 SUB cont. control	Fully clockwise
VR901 ~ 903 BIAS control	Fully counterclockwise
VR904 ~ 906 SUB BRIGHT control	Fully clockwise

(2) Video contrast adjustment
a) Adjustment of GAIN control – use signal 7 [all white signal]
i) Receive a window pattern (within a range for which ABL does not function even with a maximum contrast, and preferably with a video range of 1/3 to 1/2H x 1/2V).
ii) Turn the contrast control fully clockwise and the brightness control fully counterclockwise.
iii) Adjust VR701, VR702, and VR703 so that R, G, and B OUT respectively on the video PWB become 40 Vp-p. After adjusting, check each Vp-p, and if not proper readjust.

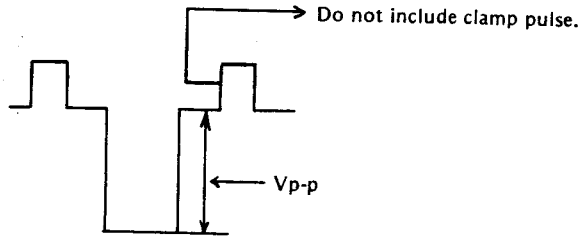


Figure 4

b) Adjustment of sub-contrast control – use signal 7 [all white signal]
   i) Turn both the contrast and brightness controls fully conterclockwise.
   ii) Adjust VR704 so that R, G, and B OUT respectively on the video PWB become 10 Vp-p. After adjusting, check each Vp-p, and if not proper readjust.

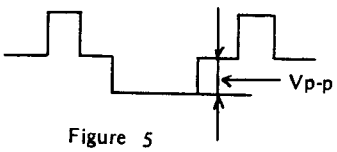


Figure 5

(3) Cut-off adjustment (all black signals)
Turn the contrast control (VR1) and screen control of FBT fully counterclockwise.
   a) Short TP901 – TP902. (CRT PWB)
   Short TP401 – GND. (DEF PWB)
   b) Turn the screen control clockwise gradualy and set to the position at which a single horizontal color appears faintly.
   Take this color as the reference color for cut-off adjustment.
   c) Turn the bias controls for a color other than the reference color clockwise until it is as bright as the reference color.
   d) Remove the TP401-GND and TP901-TP902 shorts.

NOTE: Perform the cut-off adjustment in as dark a place as possible, as this will facilitate white tracking.

(4) Adjustment of sub-brightness VR
   a) Receive the signal 8 (15.75 kHz) H grey scale (16 grades).
   IF signal generator does not function white H grey scale (16 grades), Apply 0.2V Video input insted of 5/16 grades.
   b) Turn the contrast control fully clockwise and the brightness control fully counter-clockwise.
   c) Adjust sub-bright VR905 so that the 5/16 grade appears faintly.
   From this point on, leave VR905 in this position.
   d) Turn the contrast control fully counterclockwise and the brightness control fully clockwise.
   e) Receive all black signals.
   f) Adjust VR904 and VR906 so that background raster becomes white.

Following procedure can be used instead of above. [Regarding quantum 801C]

(4)' Adjustment of sub-brightness VR
Turn the contrast control fully counter clockwise, the brightness control fully clockwise and sub-brightness control VR905 mechanical center.
   a) Receive the signal 8 (15.75 kHz) all black signal.
   b) Adjust VR904 and VR906 so that the background raster becomes white. If retrace lines appear, readjust the VR905 counter clockwise so that the retrace lines disappear, and readjust white barance.
   c) Receive the all white pattern.

d) Check the followings

NO retrace lines appear at

Contrast control fully counter clockwise.

brightness control fully clockwise.

Back raster appear at

Contrast control fully clockwise.

brightness control fully clockwise.

(5) Fine adjustment of white balance

a) Receive the white H grey scale (16 grades).

IF signal generator does not function white H grey scale (16 grades), Apply white window pattern.

(Window pattern ..... within a range for which ABL does not function)

b) Turn the contrast control fully counterclockwise and the brightness control fully clockwise.

Check that the white balance is proper for each grade.

If the background raster and the white balance for the different grades are off, fine adjust sub bright VR904 and VR906.

ATTENTION: Do not touch VR905 – G sub bright.

c) Turn the contrast control fully clockwise.

Adjust the brightness control so that no background raster appears and check that the white balance is proper for each grade.

If the white balance is off for the upper grades, fine adjust the gain control, VR701 and VR703 to match the white.

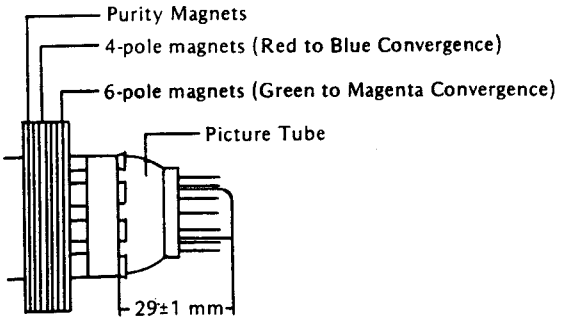
ATTENTION: Do not touch VR702 – G Gain.

6. Focus Adjustment (Use signal 3)

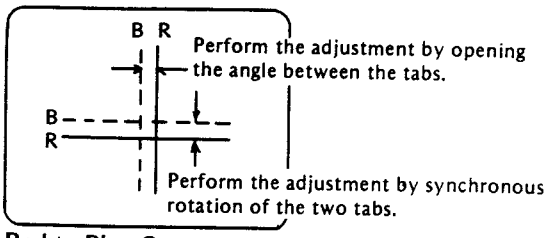
Turn the contrast control fully clockwise and set the brightness control to a suitable position. Adjust the focus control to the optimum position.

7. Purity Adjustment

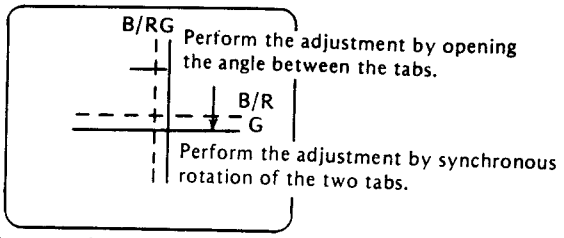
1) Be sure that the display is not being exposed to any external magnetic fields.
2) Ensure that the spacing between the Purity, Convergence Magnet, (PCM), assembly and the CRT stem is 29 mm±1 mm. (See below diagram)
3) Produce a complete, red pattern on the display. Adjust the Purity magnet rings on the PCM assembly to obtain a complete field of the color red. This is done by moving the two tabs in such a manner that they advance in an opposite direction but at the same time to obtain the same angle between the two tabs, which should be approximately 180°.
4) Check the complete blue and complete green patterns to observe their respective color purity. Make minor adjustments if needed.



Purity, Convergence Magnet Assembly (PCM)


B R
Perform the adjustment by opening the angle between the tabs.
B
R
Perform the adjustment by synchronous rotation of the two tabs.

Red to Blue Convergence
(Magenta)


B/RG
Perform the adjustment by opening the angle between the tabs.
B/R
G
Perform the adjustment by synchronous rotation of the two tabs.

Green to Magenta Convergence
(White)

8. Convergence Adjustment

1) Produce a magenta crosshatch on the display.
2) Adjust the focus for the best overall focus on the display.
   Also adjust the brightness to the desired condition.
3) Vertical red and blue lines are converged by varying the angle between the two tabs of the 4-pole magnets on the PCM assembly. (See above diagrams)
4) Horizontal red and blue lines are converged by varying the two tabs together, keeping the angle between them constant.
5) Produce a white crosshatch pattern on the display.
6) Vertical green and magenta lines are converged by varying the angle between the two tabs of the 6-pole magnets.
7) Horizontal green and magenta lines are converged by varying the two tabs together, keeping the angle between them constant.

9. Switches and Controls Operation

Confirm the following Switches and controls operate correctly.

Switches

1) TTL/ANALOG SW
2) MANUAL SW
3) 8/16/64 color select SW
4) TEXT SW
5) TEXT color SW
6) H. Width SW

Controls

1) Brightness
2) Contrast
3) V. size
4) V. position
5) V. Hold
6) H. position

10. Multi Scanning Operation

Confirm the Multi Sync operate correctly with IBM PC W/C GA, EGA also PGA, or with signal 3, 4, 5, and 6.

BY LVG-1600

①	②	③	④	⑤	ROM Adress	ROM DATA Signal 1 25K						ROM DATA Signal 2 20K					
0	CLOCK	DOT CLOCK FREQUENCY	0	MHz	(X00)	2	0.	8	0	0	F	1	6.	6	4	0	F
1	H FREQ	HORIZONTAL FREQUENCY	1	KHz	(X03)	2	5.	0	0	0	F	2	0.	0	0	0	F
2	V FREQ	VERTICAL FREQUENCY	2	Hz	(X06)	5	9.	9	5	2	F	6	0.	0	6	0	F
3	CH	CHARACTOR CELL SIZE	3	DOT	(X09)			H_0	8	V_1	0			H_0	8	V_1	0
4	Nht	4	4	CHR	(X0B)			F	1	0	4			F	1	0	4
5	Nht	5	5	CHR	(X0D)			F	0	8	0			F	0	8	0
6	Nhsp	6	6	CHR	(X0F)			F	0	8	8			F	0	8	8
7	Vpw-Hpw	7	7	V (LASTER) H (CHR)	(X11)			V_0	3	H_0	8			V_0	3	H_0	8
8	Nadj	8	8	H (LASTER)	(X13)					0	7					0	3
9	Nvt	9	9	LINE	(X14)			F	0	4	1			F	0	3	3
10	Nvd	10	10	LINE	(X16)			F	0	3	8			F	0	3	0
11	Nvsp	11	11	LINE	(X18)			F	0	3	8			F	0	3	0
12	Nvsadj	12	12	H (LASTER)	(X1A)					0	1					0	1
13	INT	13	13		(X1B)					0	0					0	0
14	OUT	14	0 Sync NEG, Hsync, Sync OFF, TTL OUT, RZ..... without dots 1 POS, HVsync, Sync ON, ANALOG OUT, NRZ..... dots		(X1C)	F	0	0	0	0	1	F	0	0	0	0	1

①	②	③	④		⑤
0	CLOCK	DOT CLOCK FREQUENCY	0		MHz
1	H FREQ	HORIZONTAL FREQUENCY	1		KHz
2	V FREQ	VERTICAL FREQUENCY	2		Hz
3	CH	CHARACTOR CELL SIZE	3		DOT
4	Nht	4	4		CHR
5	Nht	5	5		CHR
6	Nhsp	6	6		CHR
7	Vpw-Hpw	7	7		V (LASTER) H (CHR)
8	Nadj	8	8		H (LASTER)
9	Nvt	9	9		LINE
10	Nvd	10	10		LINE
11	Nvsp	11	11		LINE
12	Nvsadj	12	12		H (LASTER)
13	INT	13	13		
14	OUT	14	0 Sync NEG / 1 POS	Hsync / HVsync	Sync OFF / Sync ON; TTL OUT / ANALOG OUT; RZ..... without dots / NRZ..... dots

BY LVG-1600

ROM Adress	ROM DATA signal 3 480 LINE 30.48K						ROM DATA signal 4 400 LINE 30.48K					
(X00)	2	5.	1	1	0	F	2	5.	1	1	0	F
(X03)	3	0.	4	7	3	F	3	0.	4	7	3	F
(X06)	5	9.	9	8	7	F	5	9.	9	8	7	F
(X09)			H_0	8	V_1	0			H_0	8	V_1	0
(X0B)			F	1	0	3			F	1	0	3
(X0D)			F	0	8	0			F	0	8	0
(X0F)			F	0	8	0			F	0	8	0
(X11)			V_0	2	H_1	4			V_0	2	H_1	4
(X13)					0	8					0	8
(X14)			F	0	5	0			F	0	5	0
(X16)			F	0	4	8			F	0	4	0
(X18)			F	0	4	8			F	0	4	4
(X1A)					0	1					0	1
(X1B)					0	0					0	0
(X1C)	F	1	1	0	1	1	F	1	1	0	1	1

BY LVG-1600

①	②	③	④	⑤	ROM Adress	ROM DATA Signal 5 15.75K						ROM DATA Signal 6 22K					
0	CLOCK	DOT CLOCK FREQUENCY	0	MHz	(X00)	1	4.	2	0	0	F	1	6.	3	7	0	F
1	H FREQ	HORIZONTAL FREQUENCY	1	KHz	(X03)	1	5.	8	5	0	F	2	2.	0	0	3	F
2	V FREQ	VERTICAL FREQUENCY	2	Hz	(X06)	6	0.	5	7	7	F	5	9.	9	5	3	F
3	CH	CHARACTOR CELL SIZE	3	DOT	(X09)			H_0	8	V_1	0			H_0	8	V_1	0
4	Nht	4	4	CHR	(X0B)			F	1	1	2			F	0	9	3
5	Nht	5	5	CHR	(X0D)			F	0	8	0			F	0	8	0
6	Nhsp	6	6	CHR	(X0F)			F	0	9	2			F	0	8	0
7	Vpw-Hpw	7	7	V (LASTER) H (CHR)	(X11)			V_0	1	H_0	7			V_1	3	H_1	0
8	Nadj	8	8	H (LASTER)	(X13)					0	0					0	6
9	Nvt	9	9	LINE	(X14)			F	0	2	6			F	0	3	6
10	Nvd	10	10	LINE	(X16)			F	0	2	0			F	0	3	5
11	Nvsp	11	11	LINE	(X18)			F	0	2	3			F	0	3	5
12	Nvsadj	12	12	H (LASTER)	(X1A)					0	5					0	1
13	INT	13	13		(X1B)					0	0					0	0
14	OUT	14	0 Sync NEG, Hsync, Sync OFF, TTL OUT, RZ..... without dots 1 POS, HVsync, Sync ON, ANALOG OUT, NRZ..... dots		(X1C)	F	1	0	0	0	1	F	1	0	0	0	1

①	②	③	④	⑤
0	CLOCK	DOT CLOCK FREQUENCY	0	MHz
1	H FREQ	HORIZONTAL FREQUENCY	1	KHz
2	V FREQ	VERTICAL FREQUENCY	2	Hz
3	CH	CHARACTOR CELL SIZE	3	DOT
4	Nht	4	4	CHR
5	Nht	5	5	CHR
6	Nhsp	6	6	CHR
7	Vpw-Hpw	7	7	V (LASTER) H (CHR)
8	Nadj	8	8	H (LASTER)
9	Nvt	9	9	LINE
10	Nvd	10	10	LINE
11	Nvsp	11	11	LINE
12	Nvsadj	12	12	H (LASTER)
13	INT	13	13	
14	OUT	14	0 Sync NEG / Hsync / Sync OFF / TTL OUT / RZ..... without dots 1 POS / HVsync / Sinc ON / ANALOG OUT / NRZ..... dots	

BY LVG-1600

ROM Adress	ROM DATA signal 7 ¼H WINDOW 15.75K						ROM DATA Signal 8 15.75K					
(X00)	1	4.	2	0	0	F	1	4.	2	0	0	F
(X03)	1	5.	8	5	0	F	1	5.	8	5	0	F
(X06)	6	0.	5	7	7	F	6	0.	5	7	7	F
(X09)			H_0	8	V_1	0			H_0	8	V_1	0
(X0B)			F	1	1	2			F	1	1	2
(X0D)			F	0	2	0			F	0	8	0
(X0F)			F	0	6	2			F	0	9	2
(X11)			V_0	1	H_0	7			V_0	1	H_0	7
(X13)					0	0					0	0
(X14)			F	0	2	6			F	0	2	6
(X16)			F	0	1	0			F	0	2	0
(X18)			F	0	1	8			F	0	2	3
(X1A)					0	5					0	5
(X1B)					0	0					0	0
(X1C)	F	1	0	0	1	1	F	1	0	0	1	1

① Indication address ② Abbreviation ③ Description ④ Contents ⑤ Unit

Description of each address

add.	Description	Condition
0		05.000 ~ 40.000 MHz, 5- or 6-digit 2.5KHz step for 10 MHz or lower, 5 KHz step for 10 ~ 20 MHz, and 10 KHz step for 20 MHz or higher
1		Reference data, 5-digit
2		Reference data, 5-digit
3		(H direction) x (V direction), 02 to 16 01 to 32 each 2-digit
4	Total number of characters, horizontal	255 characters or less, 3-digit
5	Number of indication characters, horizontal	N_{ht} or less, 3-digit
6	Horizontal sychronization position	N_{ht} or less, 3-digit
7	Vertical/horizontal pulse width	V: 1 to 16 H/H:1 to 15 chr.
8	Total raster adjustment	31 H or less
9	Total number of characters, vertical	127 rows or less, 3-digit
10	Number of indication characters, vertical	N_{vt} or less
11	Vertical synchronization position	N_{vt} or less
12	Vertical indication position correction	0 ~ 16 H (Synchronization position moves in the form of $N_{vsp} + N_{vsadj}$)
13	Interlace select	00: non-interlace 01: interlace
14	Output condition setting	

Likewise, when significant data is a single digit, do not forget to enter 0.

DATA FORMAT FOR USING Quantum 801C

TIMING PARAMETERS:

Real Time Parameters

Dot Rate	MHz
Horizontal Rate	KHz
Vertical Rate	Hz

Non-Real Time Parameters

Horizontal	Vertical
Dots/Character	Lines/Character
Total	Total
Characters	Rows
Drive Delay	Drive Delay
Drive Width	Drive Width
	Step Width

SIGNAL'S DISCRIPTION:

Signal No.	Description
1	H: 25kHz
2	H: 20kHz
3	H: 30.48kHz (480 lines)
4	H: 30.48kHz (400 lines)
5	H: 15.85kHz
6	H: 22kHz
7	H: 15.85kHz WINDOW PATTERN
8	H: 15.85kHz

OPTION PARAMETERS

Signal Gating

Composite Sync	OP 1.—0 = off 1 = on
Vertical Step	OP 2.—0 = off 1 = on
Horizontal Drive	OP 3.—0 = off 1 = on
Vertical Drive	OP 4.—0 = off 1 = on

Signal Polarity

Composite Sync	OP 5.—0 = non-inverted 1 = inverted
Vertical Step	OP 6.—0 = non-inverted 1 = inverted
Horizontal Drive	OP 7.—0 = non-inverted 1 = inverted
Vertical Drive	OP 8.—0 = non-inverted 1 = inverted
Video	OP 13.—0 = non-inverted/positive 1 = inverted/positive 2 = non-inverted/negative 3 = inverted/negative
Interlace Mode	OP 9.—0 = non-interlace 1 = interlaced sync only 3 = interlaced sync & video
Video Mode	OP 10.—0 = monochrome 1 = color
Duty Cycle	OP 11.—0 = 50% 1 = 100% (OP 12.0) 0 or 1 = 100% (OP 12.2)
Character Clocking Mode	OP 12.—0 = single-phase 2 = dual-phase
Horizontal Skew	OP 14.—skew right 0—3 dots
Vertical Skew	OP 15.—skew down 0—9 lines
Cursor	OP 16.—0 = off 1 = fast blink 2 = slow blink 3 = on continuous

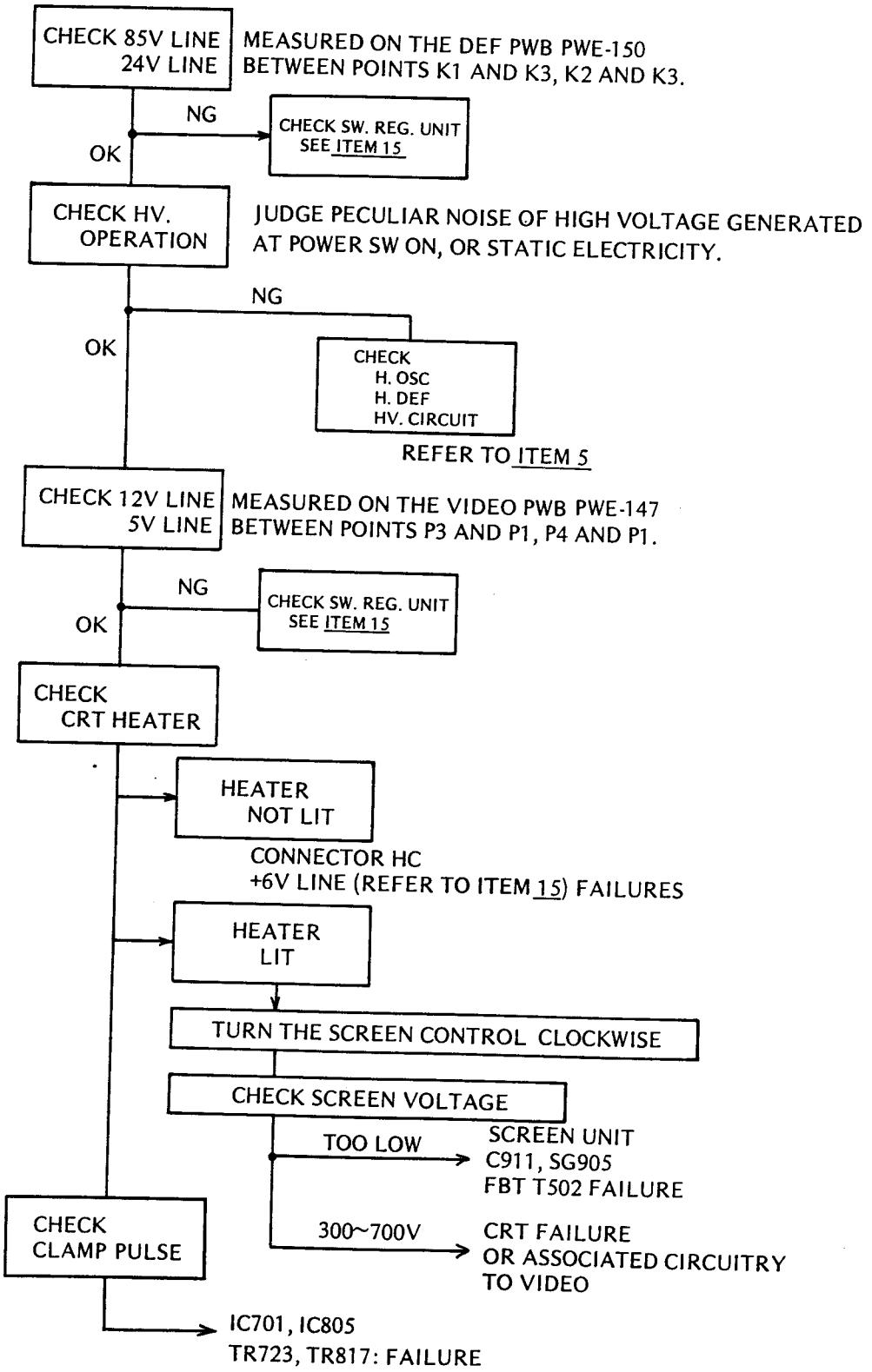
TEST SIGNALS FOR USING Quantum 801C

SIGNAL No.	1	2	3	4	5	6	7	8
Real Time Parameters								
Dot Rate (MHz)	20.800	16.640	25.112	25.112	14.200	16.368	14.200	14.200
Horizontal Rate (kHz)	25.000	20.000	30.476	30.476	15.848	22.000	15.848	15.848
Vertical Rate (Hz)	59.95	60.06	59.99	59.99	60.03	60.11	60.03	60.03
Non-Real Time Parameters								
H: Dots/Character	8	8	8	8	8	8	8	8
Total	104	104	103	103	112	93	112	112
Characters	80	80	80	80	80	80	20	80
Drive Delay	88	88	80	80	92	80	62	92
Drive Width	8	8	14	14	7	10	7	7
V: Lines/Character	10	10	10	10	10	10	10	10
Total	417	333	508	508	264	366	264	264
Rows	38	30	48	40	20	35	10	20
Drive Delay	38	30	48	44	23	35	18	23
Drive Width	3	3	2	2	1	13	1	1
Step Width	–	–	–	–	–	–	–	–
Signal Gating								
Composite Sync	1	1	1	1	1	1	1	1
Vertical Step	0	0	0	0	0	0	0	0
Horizontal Drive	1	1	1	1	1	1	1	1
Vertical Drive	1	1	1	1	1	1	1	1
Signal Polarity								
Composite Sync	1	1	1	1	1	1	1	1
Vertical Step	–	–	–	–	–	–	–	–
Horizontal Drive	1	1	1	1	1	1	1	1
Vertical Drive	1	1	1	1	1	1	1	1
Video	0	0	0	0	0	0	0	0
Interlace Mode	0	0	0	0	0	0	0	0
Video Mode	1	1	1	1	1	1	1	1
Duty Cycle	0	0	0	0	0	0	0	0
Character Clocking Mode	0	0	0	0	0	0	0	0
Horizontal Skew	–	–	–	–	–	–	–	–
Vertical Skew	–	–	–	–	–	–	–	–
Cursor	–	–	–	–	–	–	–	–

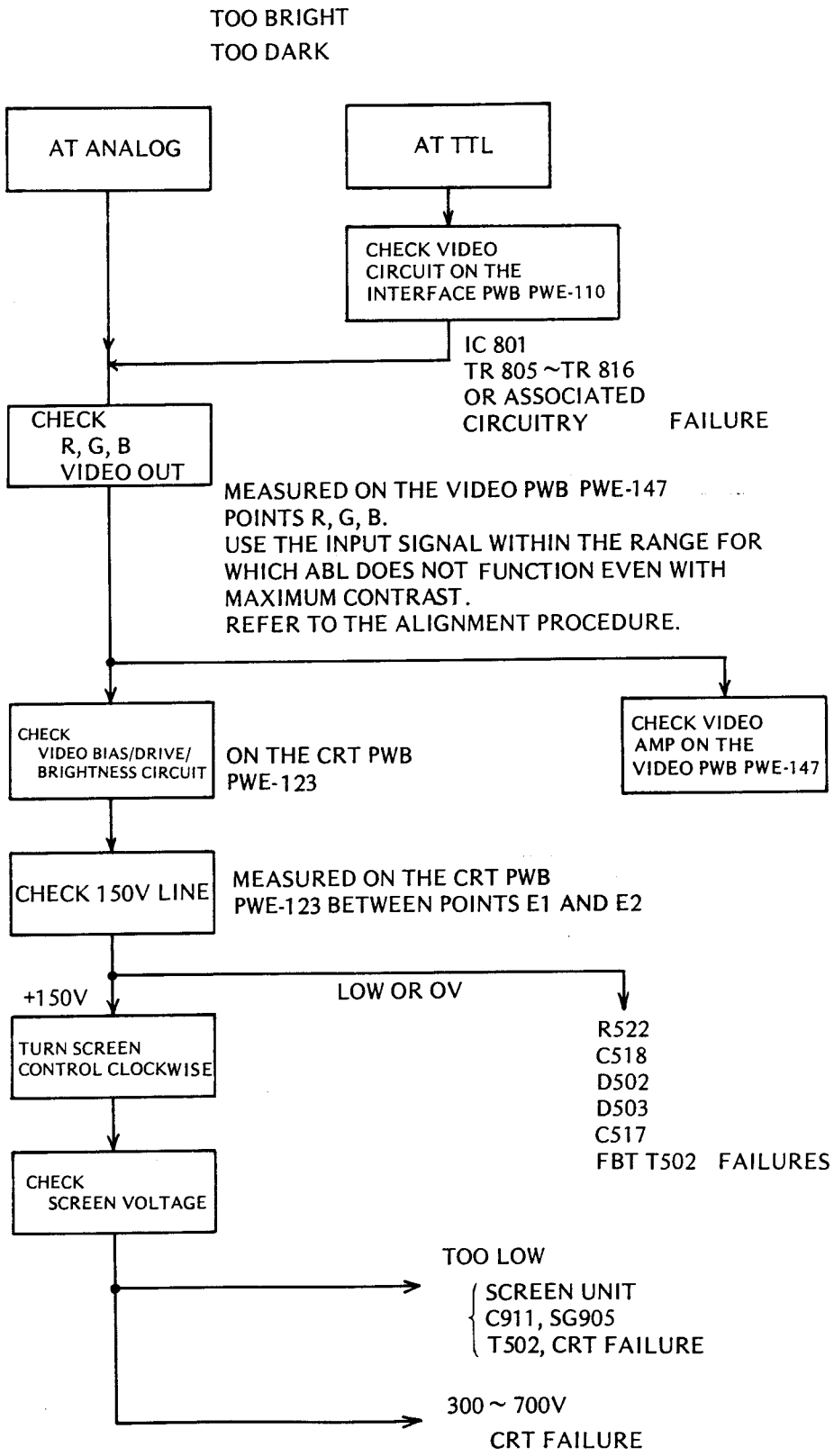
TROUBLE SHOOTING

BEFORE USING THIS CHART, PLEASE REFER TO THE TROUBLESHOOTING
THE USER'S MANUAL.

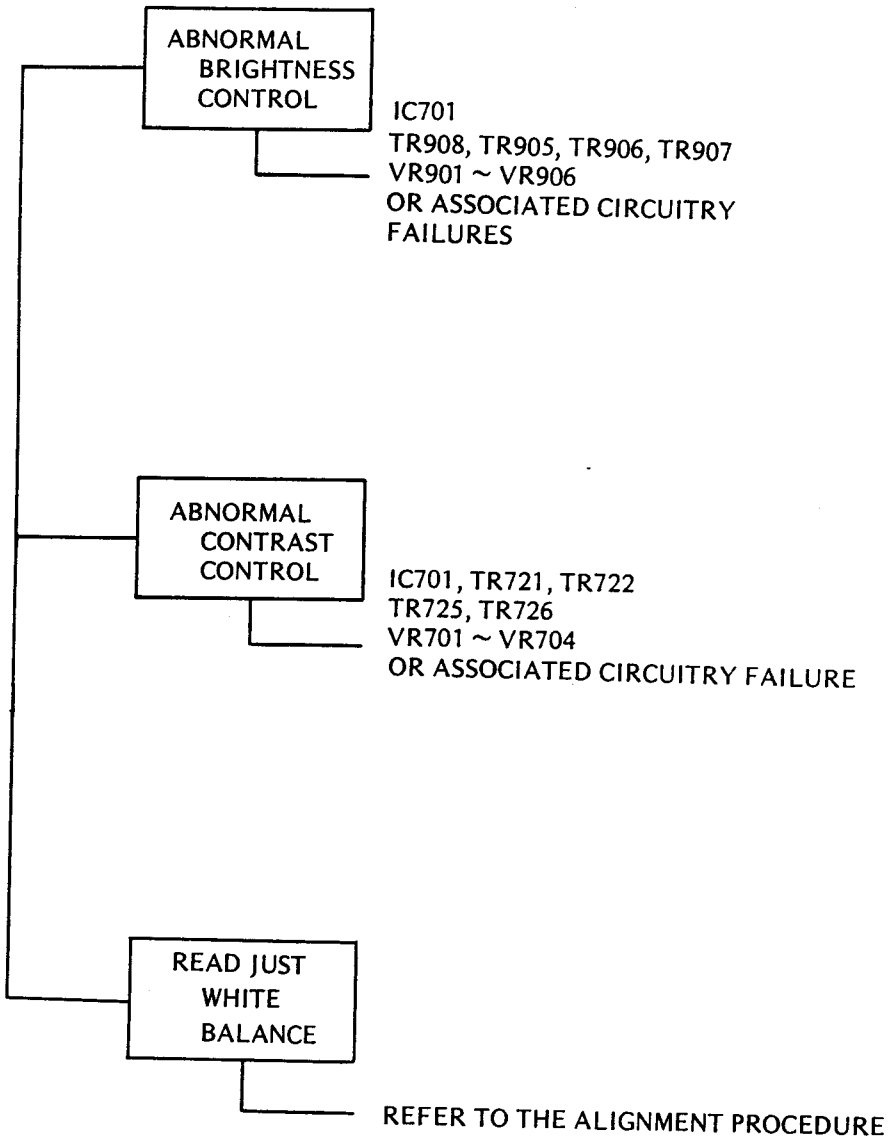
1. NO RASTER



2. ABNORMAL VIDEO ON CRT SCREEN

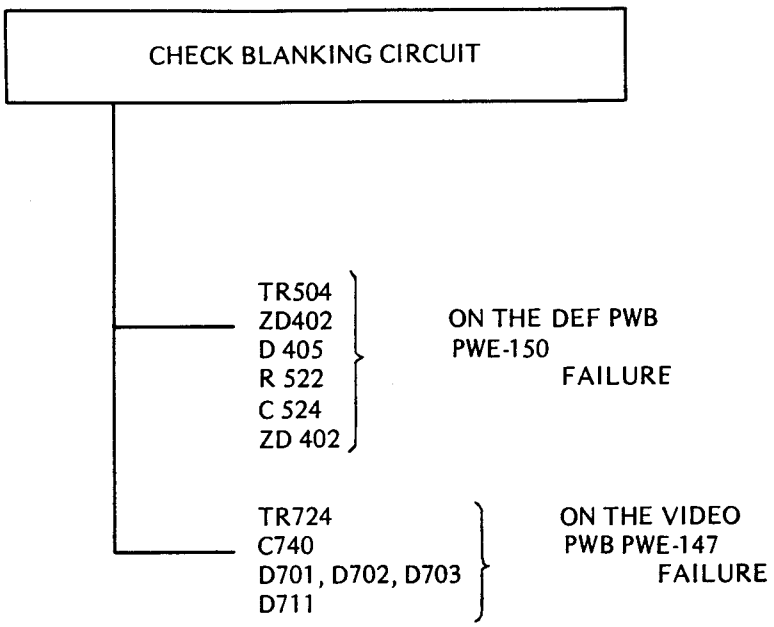


3. ABNORMAL WHITE BALANCE AND TRACKING



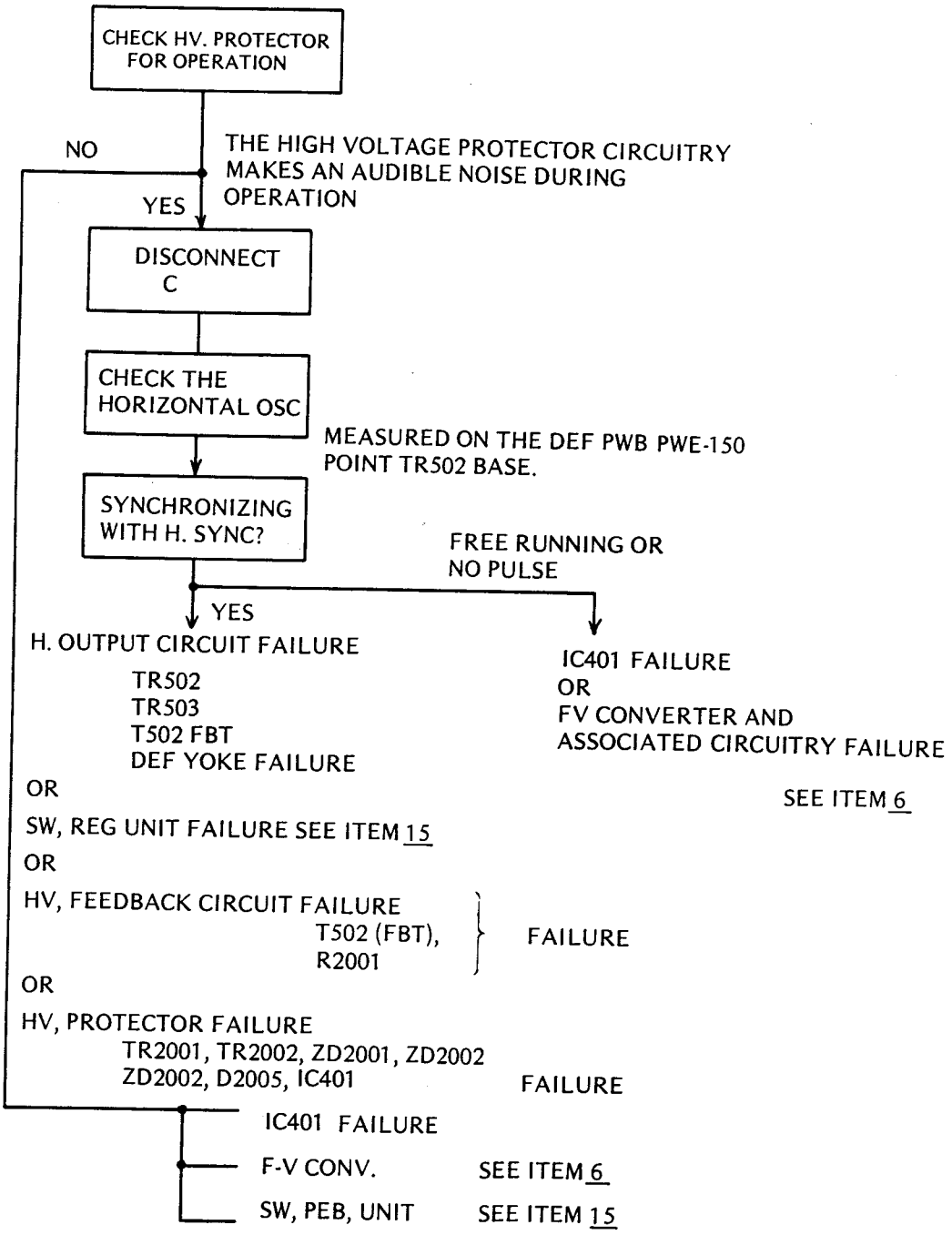
4. NO BLANKING WORKS

VISIBLE RETRACE LINE ON THE BACK RASTER

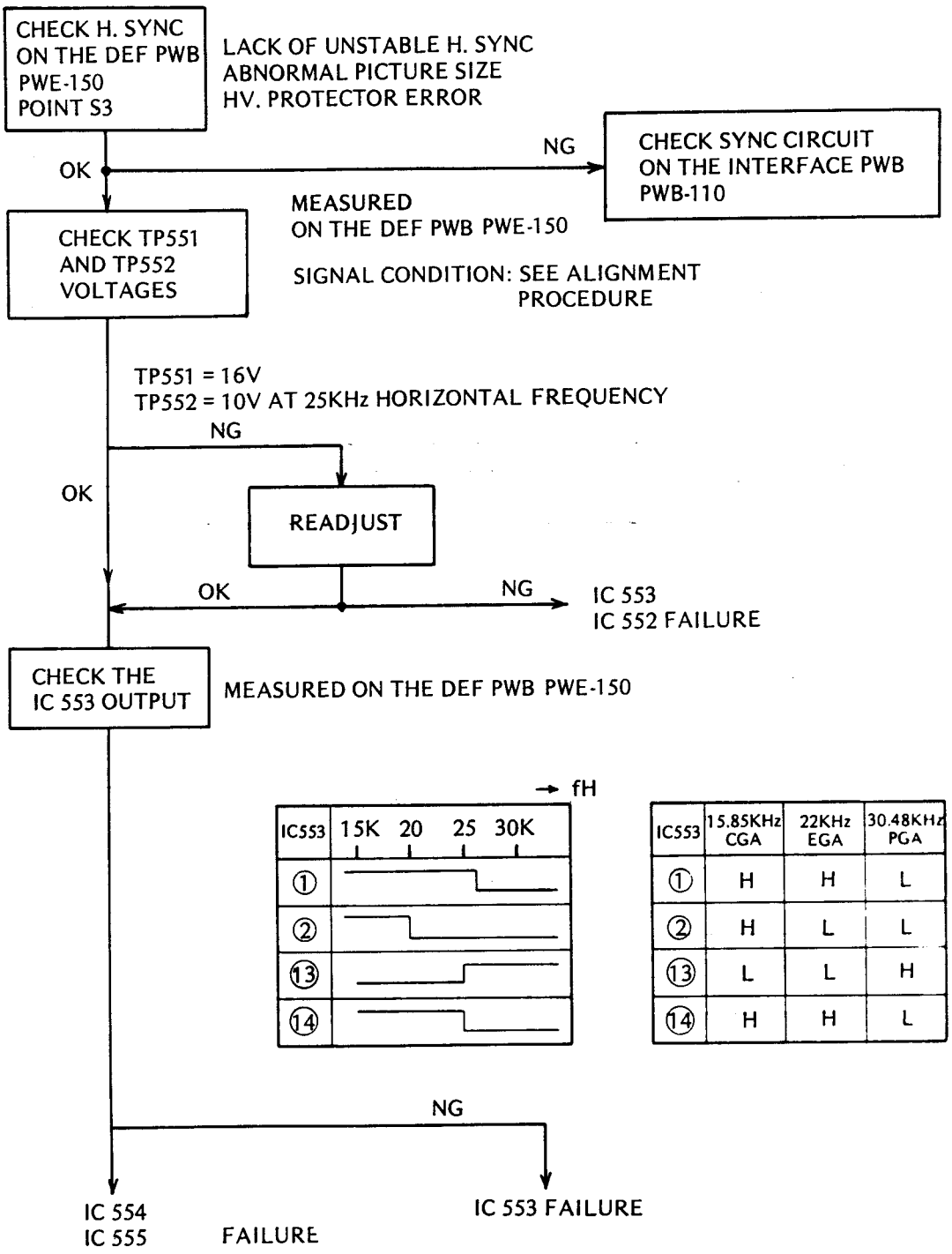


5. H. OSC/DEF/HV. CIRCUIT FAULT

NO RASTER
ABNORMAL PICTURE SIZE
ABNORMAL VIDEO ON THE CRT SCREEN

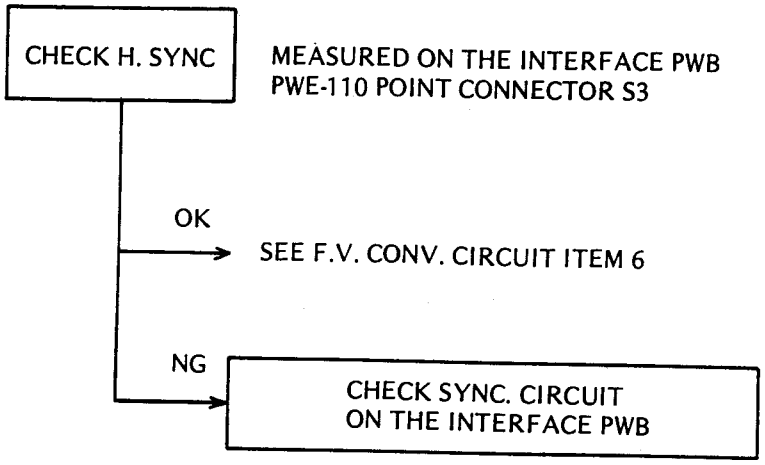


6. F-V CONVERTER AND ASSOCIATED CIRCUITRY

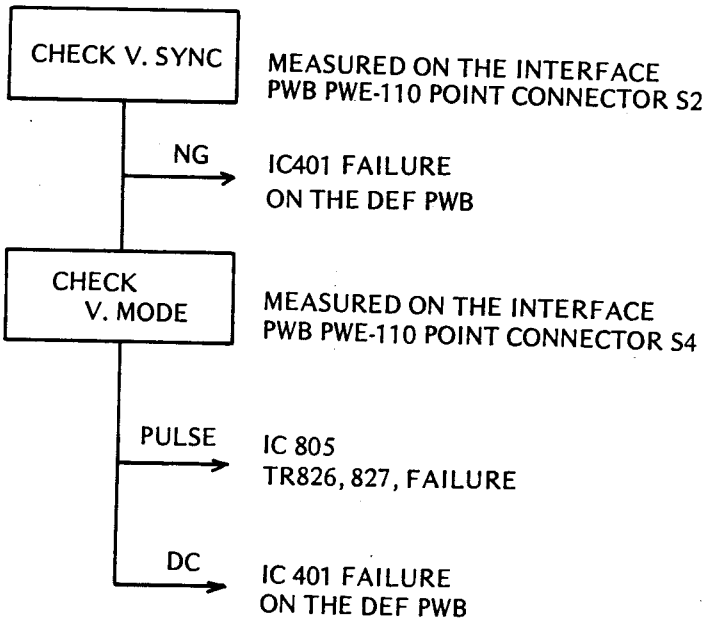


7. LACK OF UNSTABLE SYNCHRONIZATION

HORIZONTAL

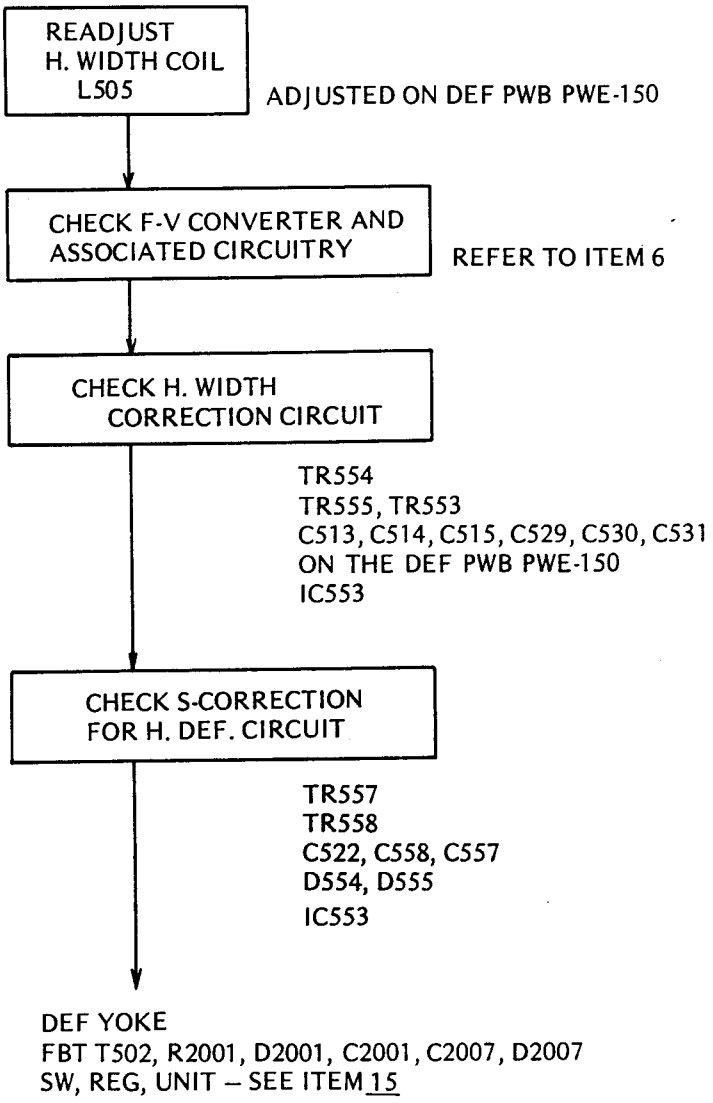


VERTICAL

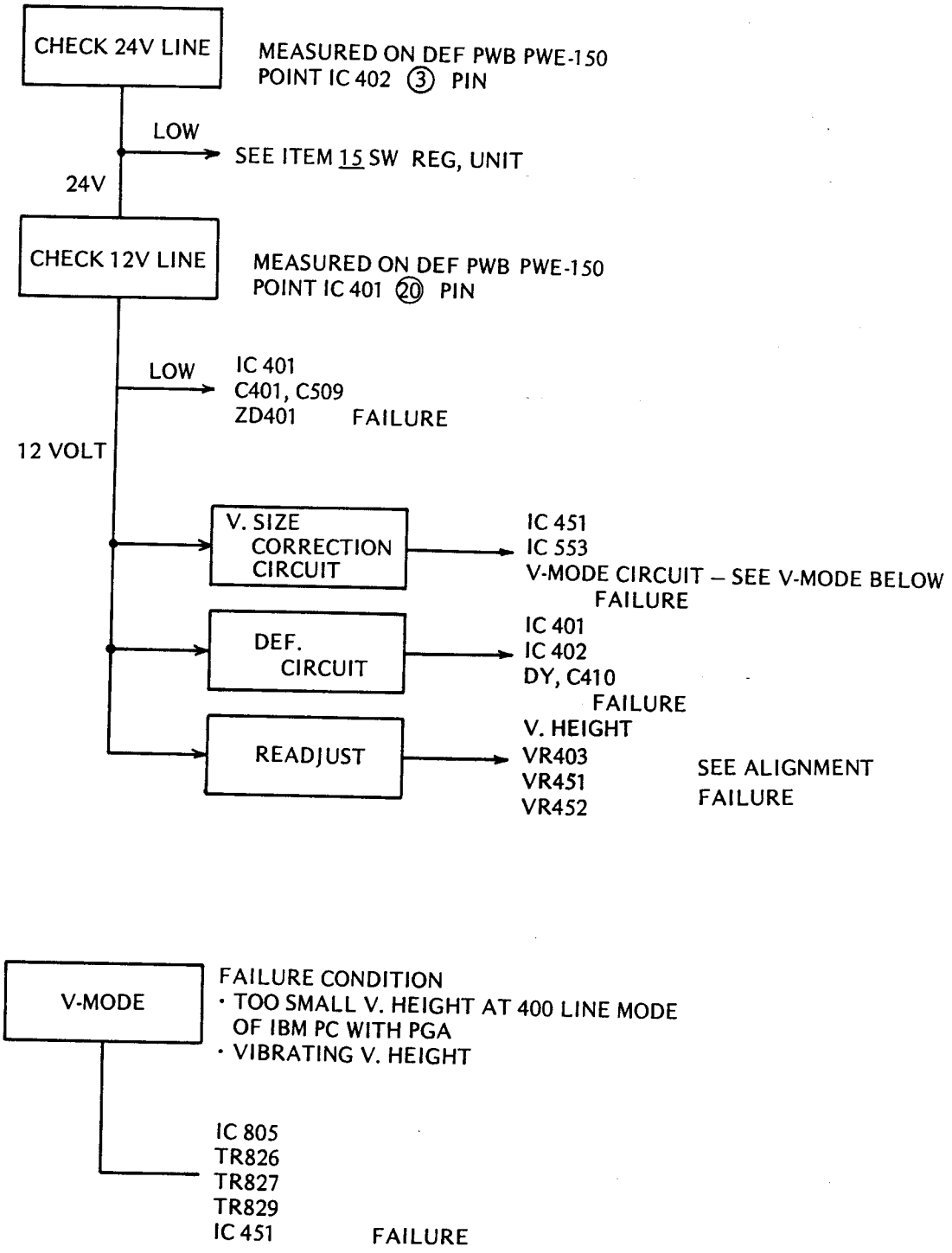


8. PICTURE SIZE

ABNORMAL HORIZONTAL WIDTH



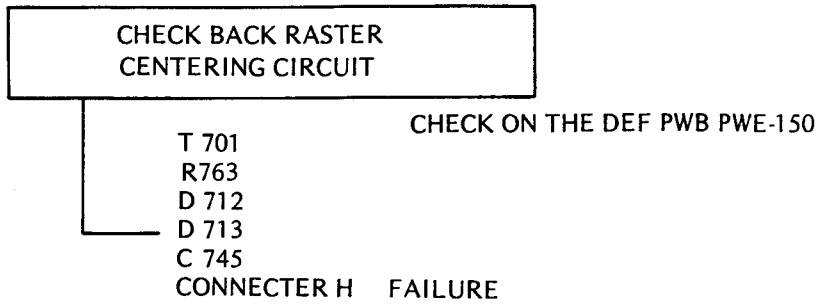
ABNORMAL VERTICAL HEIGHT



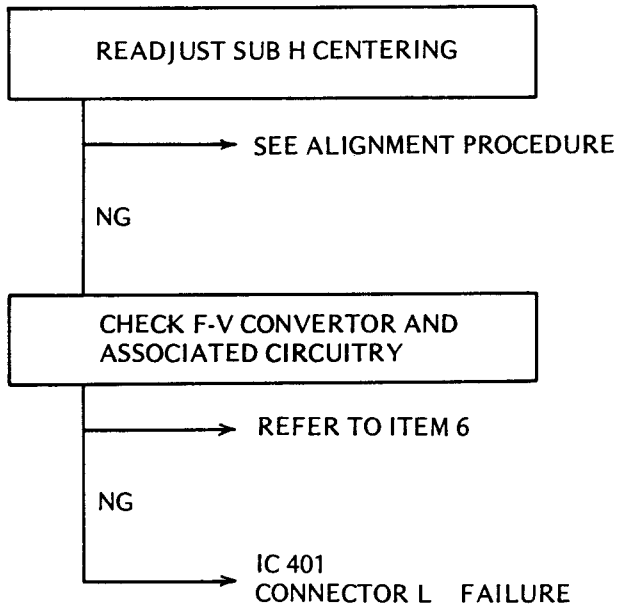
9. CENTERING

9-1. HORIZONTAL

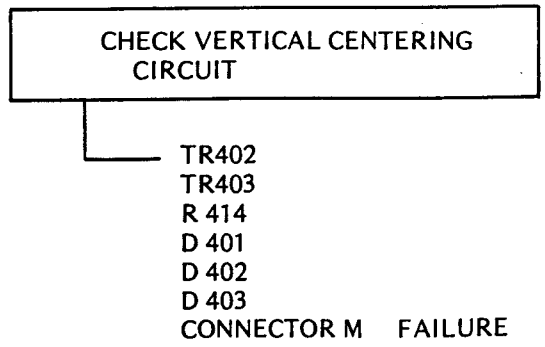
a) BACK RASTER CENTERING



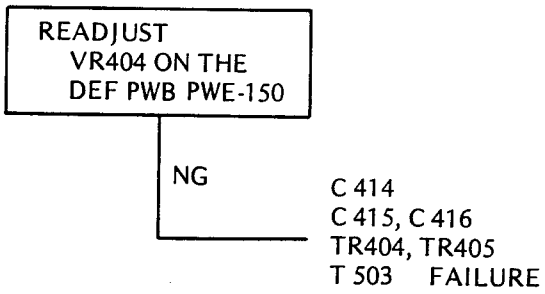
b) PICTURE CENTERING



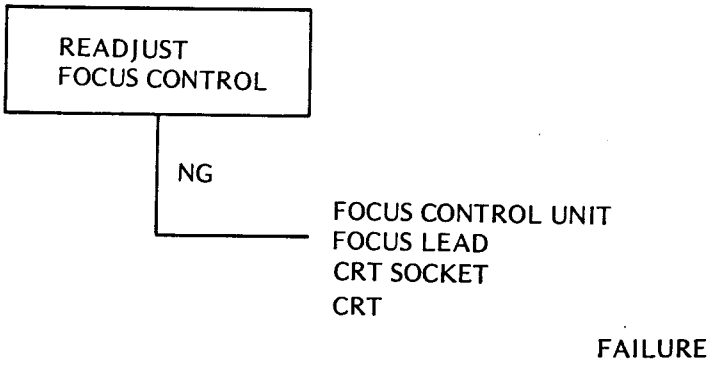
9-2. VERTICAL



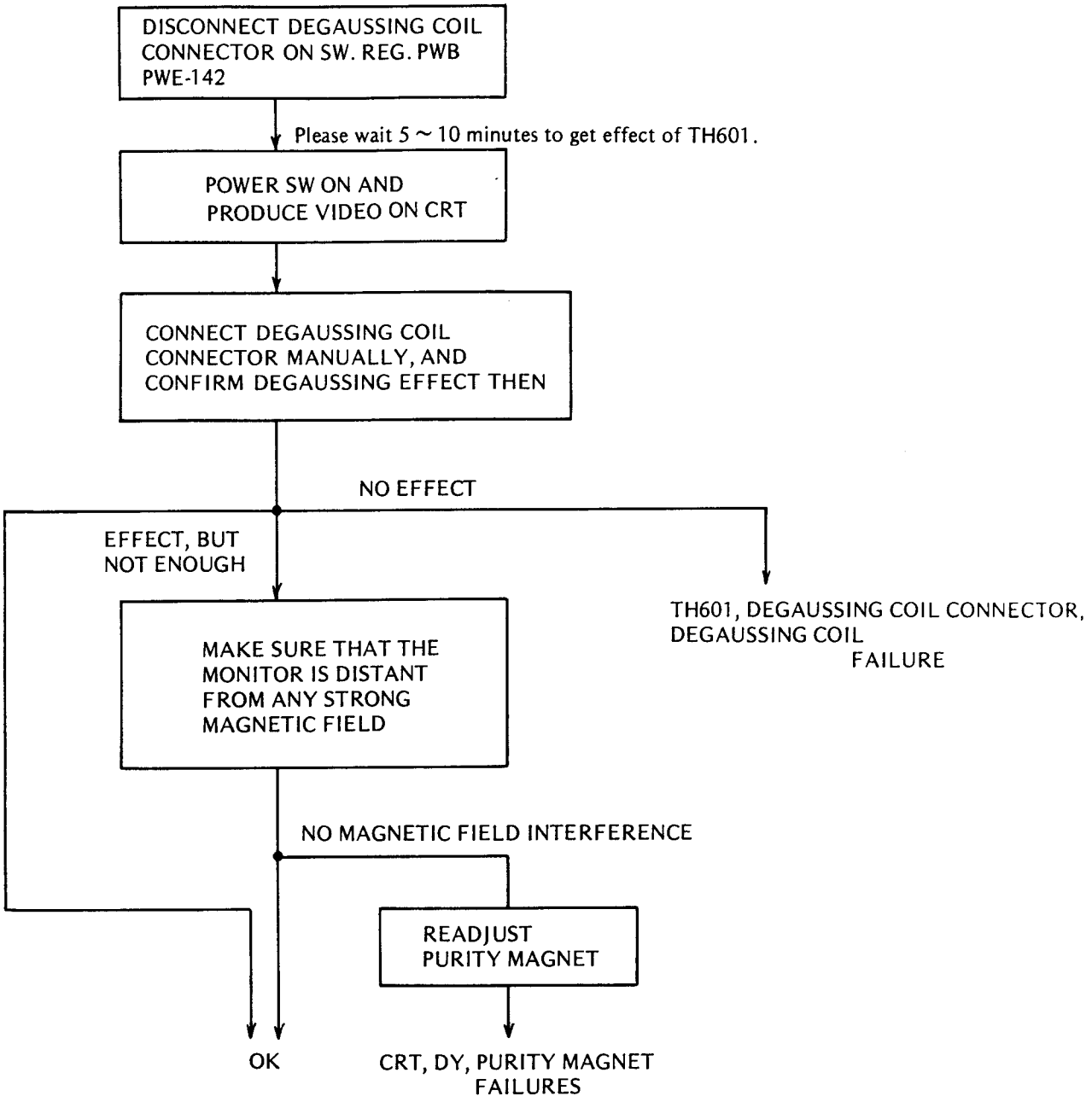
10. SIDE PINCUSHION DISTORTION FAILURE



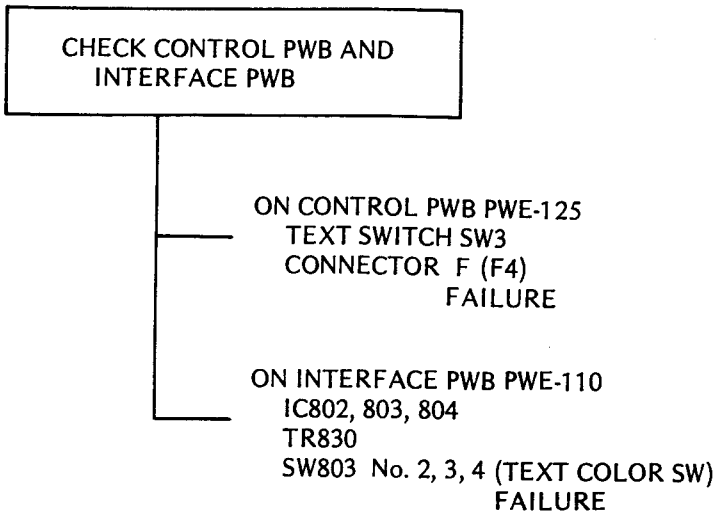
11. POOR FOCUS



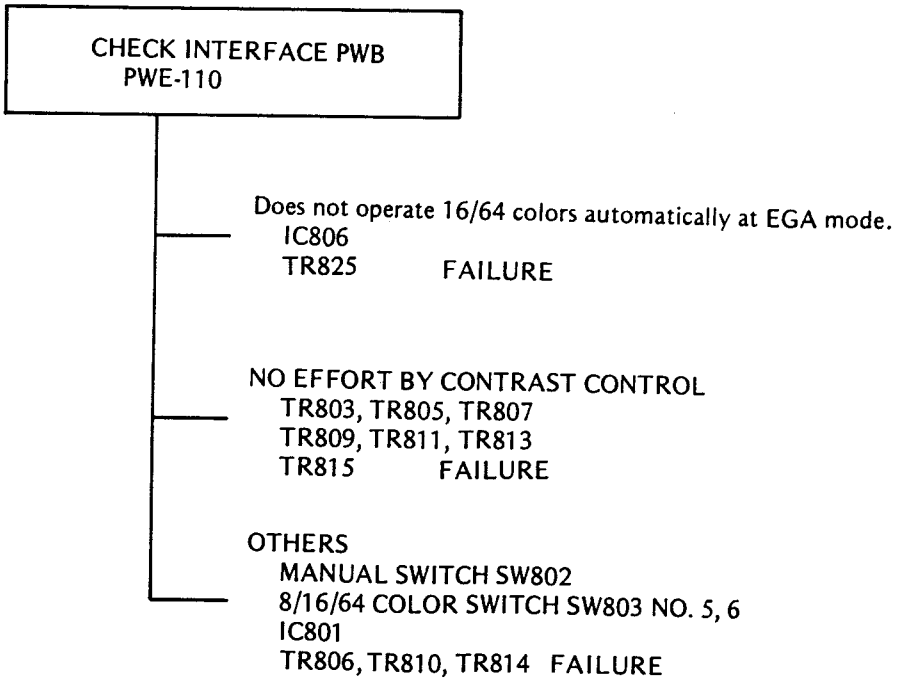
12. IMPURITY ON CRT SCREEN


DISCONNECT DEGAUSSING COIL CONNECTOR ON SW. REG. PWB PWE-142
Please wait 5 ~ 10 minutes to get effect of TH601.
POWER SW ON AND PRODUCE VIDEO ON CRT
CONNECT DEGAUSSING COIL CONNECTOR MANUALLY, AND CONFIRM DEGAUSSING EFFECT THEN
NO EFFECT
EFFECT, BUT NOT ENOUGH
TH601, DEGAUSSING COIL CONNECTOR, DEGAUSSING COIL FAILURE
MAKE SURE THAT THE MONITOR IS DISTANT FROM ANY STRONG MAGNETIC FIELD
NO MAGNETIC FIELD INTERFERENCE
READJUST PURITY MAGNET
OK
CRT, DY, PURITY MAGNET FAILURES

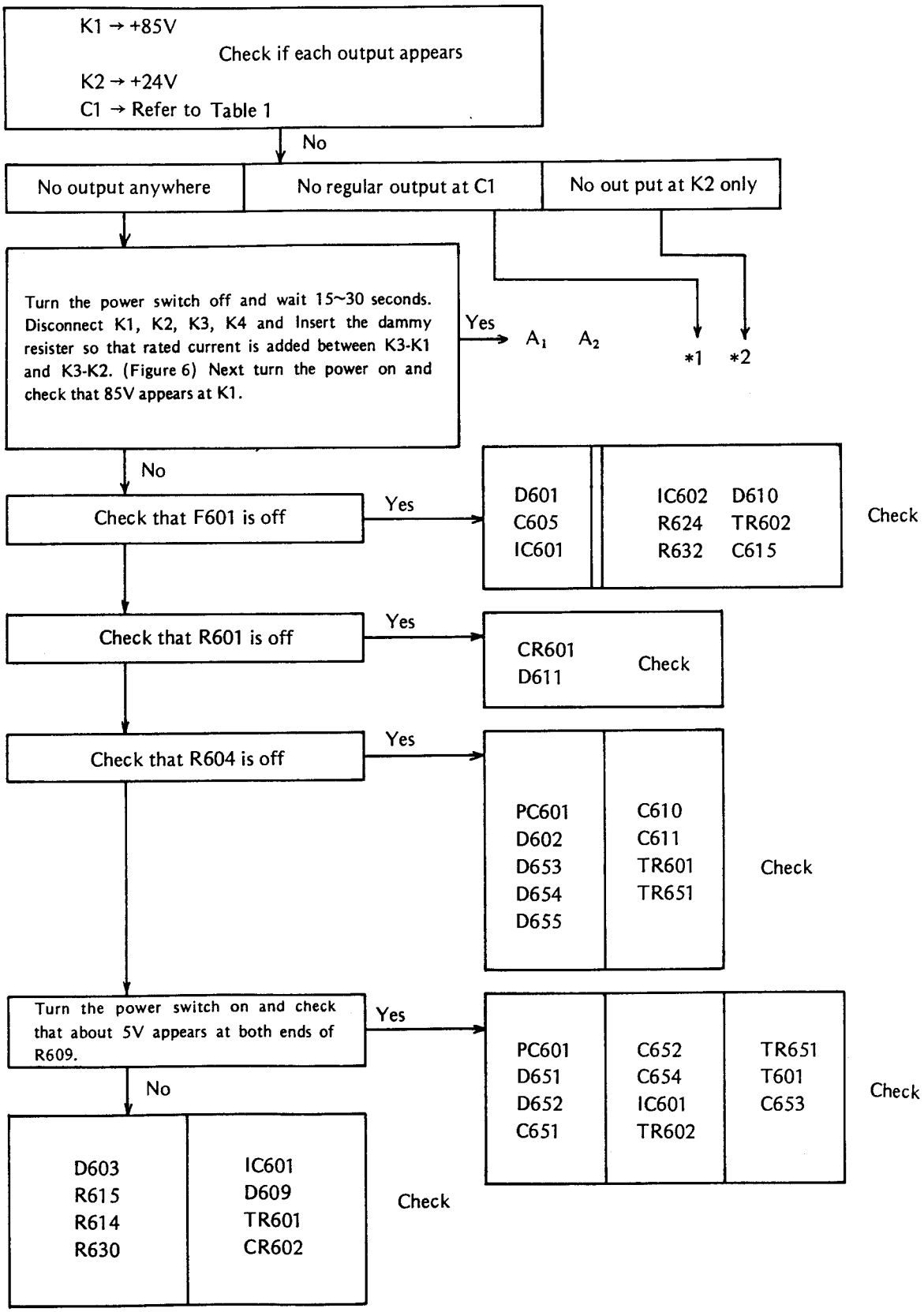
13. ABNORMAL TEXT MODE OPERATION

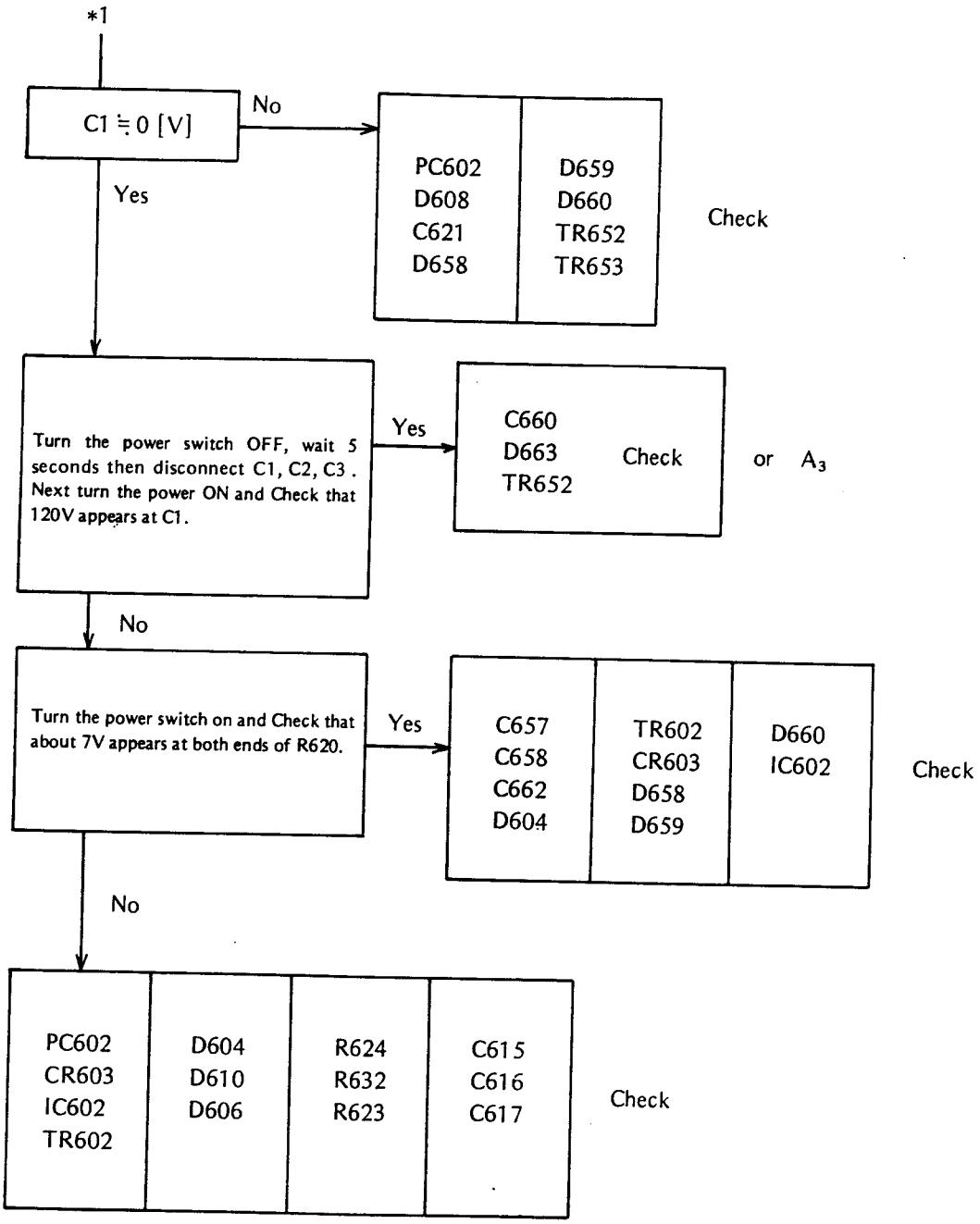


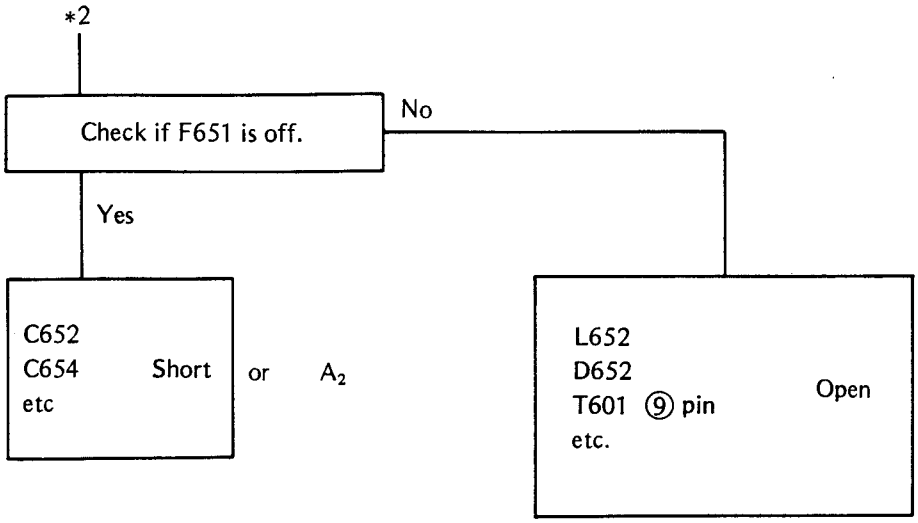
14. ABNORMAL COLOR AT TTL MODE



15. SWITCHING REGULATOR UNIT




*1
C1 ≒ 0 [V]
No
Yes
PC602
D608
C621
D658
D659
D660
TR652
TR653
Check
Turn the power switch OFF, wait 5 seconds then disconnect C1, C2, C3 . Next turn the power ON and Check that 120V appears at C1.
Yes
C660
D663
TR652
Check
or A3
No
Turn the power switch on and Check that about 7V appears at both ends of R620.
Yes
C657
C658
C662
D604
TR602
CR603
D658
D659
D660
IC602
Check
No
PC602
CR603
IC602
TR602
D604
D610
D606
R624
R632
R623
C615
C616
C617
Check



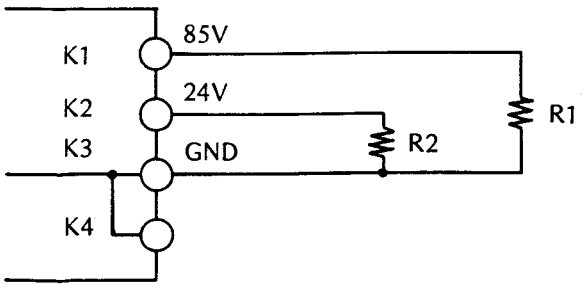
An Trouble excluding Switching Regulator (see next page)

Table 1. C1 output voltage

Horizontal Frequency [KHz]	C1 Voltage [V]
15.85 (CGA)	51 ± 2.6
22 (EGA)	64 ± 3.2
30.48 (PGA)	93 ± 4.7

With no input signal, about 45V should appears at C1.

Figure 6. Rated load current at K1 and K2 terminal



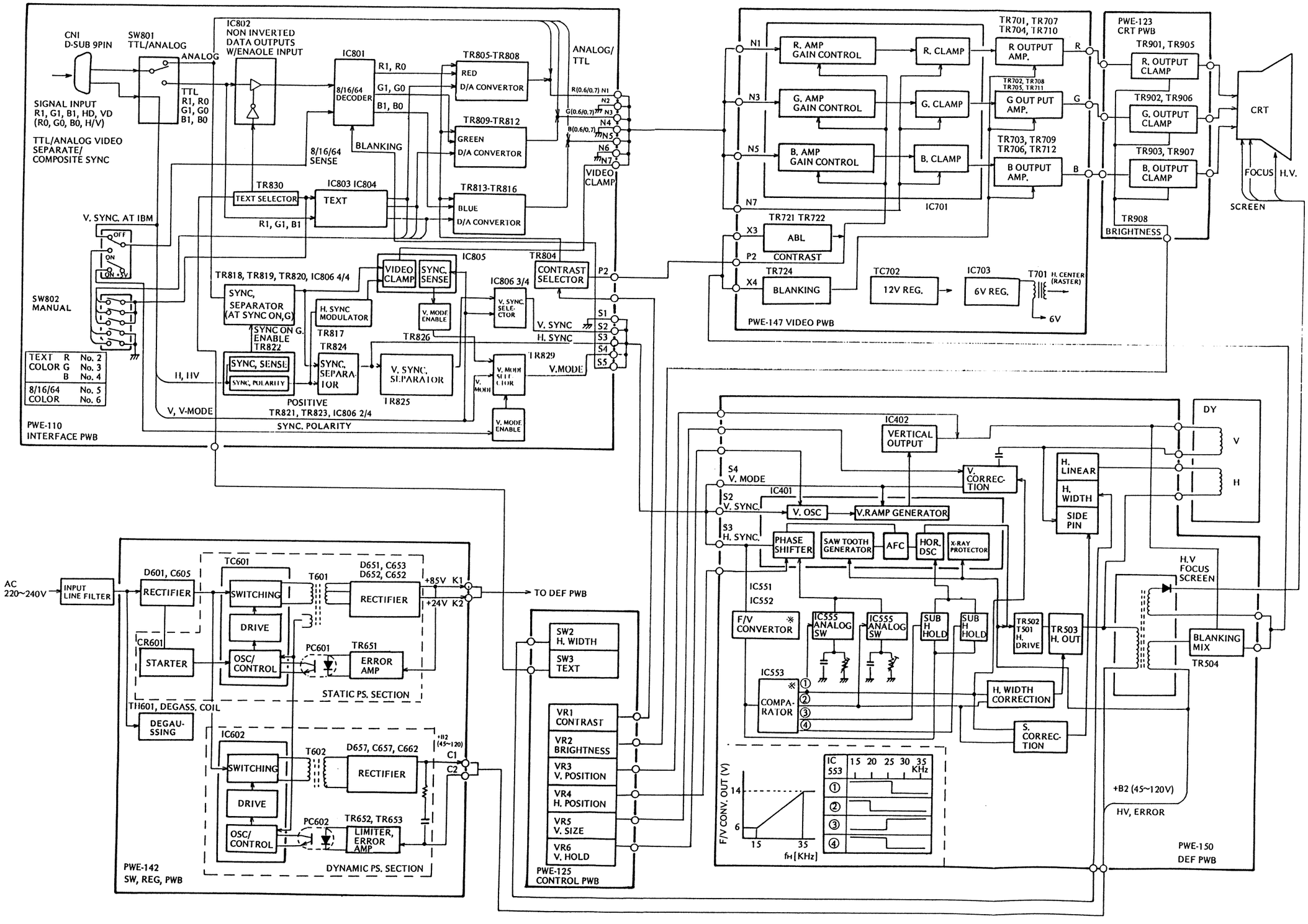
+85V	0.015 ~ 0.11A R1 (5.67KΩ ~ 772Ω)
+24V	0.4 ~ 0.91 A R2 (60Ω ~ 26Ω)

Attention) Do not power on SW. REG. unit itself without the load at K1, K2, or it may misoperate protector.

MAIN VOLTAGE LINE FAILURE EXCEPT SW. REG. UNIT

VOLTAGE LINE		FAILURE PARTS	PWB ASSY	REMARKS
(A1) 85V CONNECTOR K1–K3		D554, D555 TR501 TR502	DEF PWB PWE-150	
		TR707 ~ TR712 R731 ~ R736 C742, C743, C745	VIDEO PWB PWE-147	
(A2) 24V K2–K3 AND ASSOCIATED VOLTAGE LINES	24V CONNECTOR K2–K3	D404, IC402, C409	DEF PWB PWE-150	BECAUSE OF FAILURE BELOW PART MAY BE DAMAGE 1. F651 1.6A 2. R780 2.2Ω 1/2W 3. R781 4.7Ω 1/2W 4. TR741
		TR721, IC702, IC703 ZD702 C752, C758, C759, T501	VIDEO PWB PWE-147	
	12V CONNECTOR P3–P1	C731 AND ASSOCIATED CIRCUITRY OF VIDEO AMP CIRCUIT USING 12 Volts Supply	VIDEO PWB PWE-147	
		IC801 C810, C829, TR801 ZD801, C810	INTERFACE PWB PWE-110	
	6V CONNECTOR HC2–HC3	CRT HEATER	CRT PWB PWF-123	
		C742	VIDEO PWB PWE-147	
		INTERFACE CIRCUIT BASED ON 5V LINE BETWEEN CONNECTOR P4 AND P1 TTL ICs	INTERFACE PWB PWE-110	
(A3) 45 ~ 120V CONNECTOR C1–C3		C516 FBT D501 TR503 C513, C514, C515 DEFLECTION YOKE	DEF PWB PWE-150	
(A3) HIGH VOLTAGE FEEDBACK VOLTAGE CONNECTOR C2–C3		FBT C2001, C2007 D2001, D2007 OTHERS	DEF PWB PWE-150	SEE ITEM 5

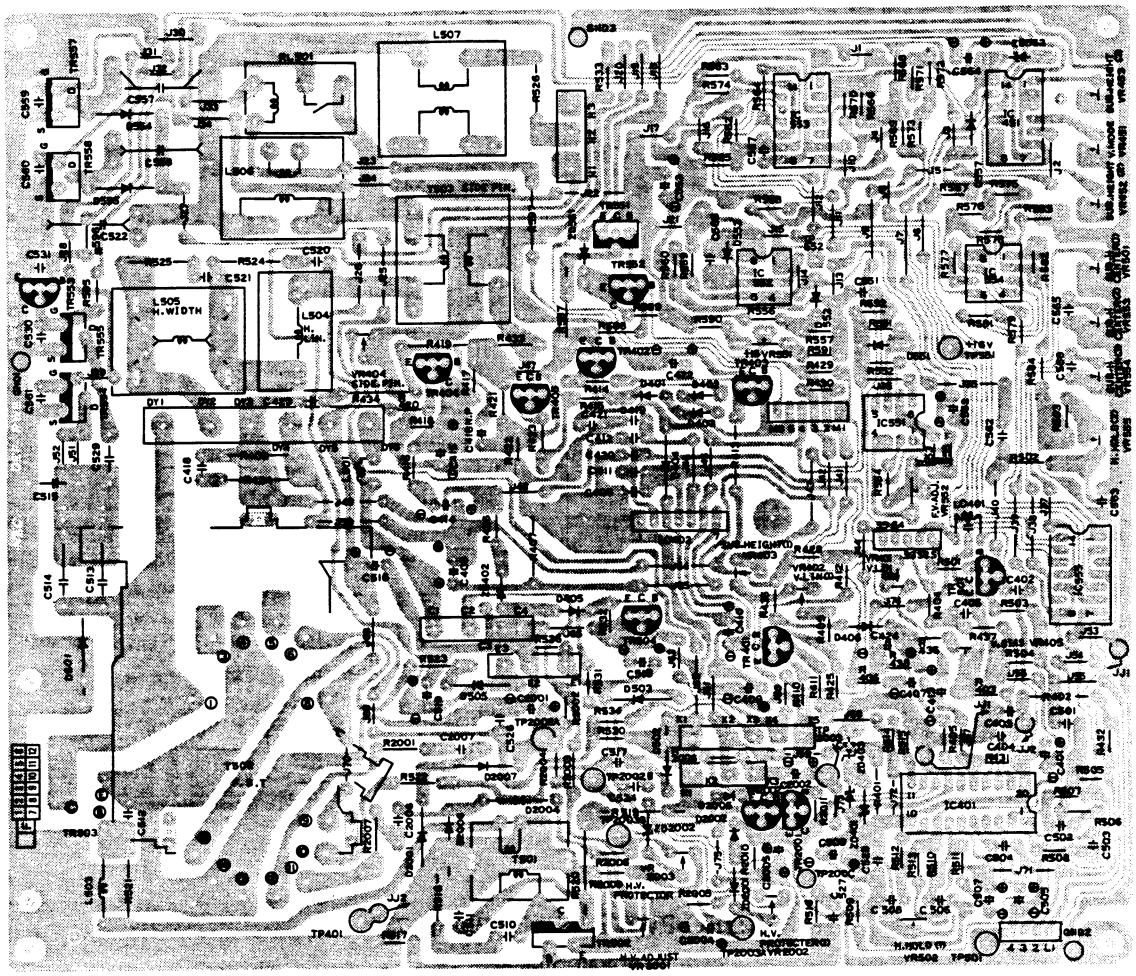
BLOCK DIAGRAM



PRINTED WIRING BOARD

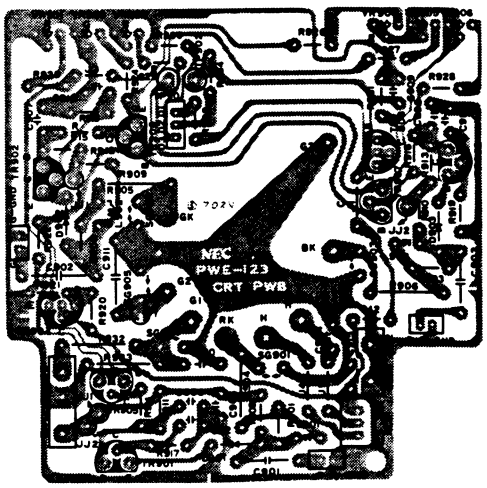
DEFLECTION PWB ARR'Y (PWE 150)

– Solder Side –



CRT PWB ASS'Y (PWE 123)

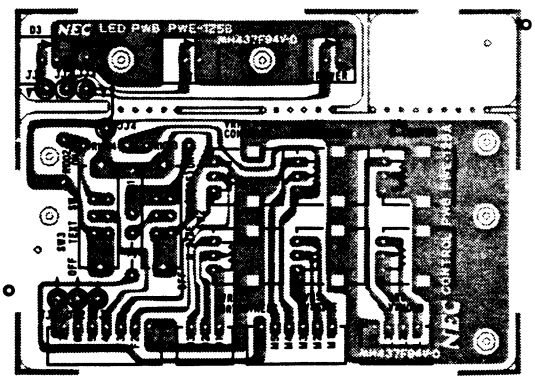
– Solder Side –



CONTROL PWB ASS'Y (PWE 125A)

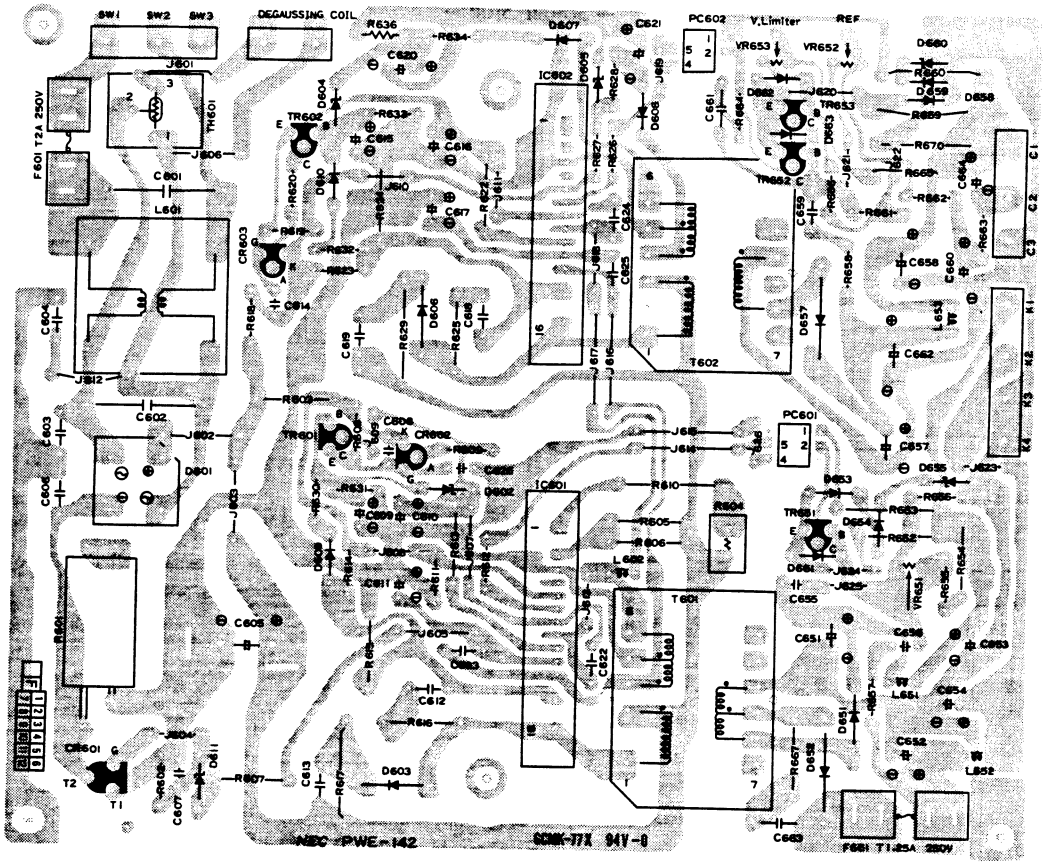
LED PWB ASS'Y (PWE 125B)

– Solder Side –



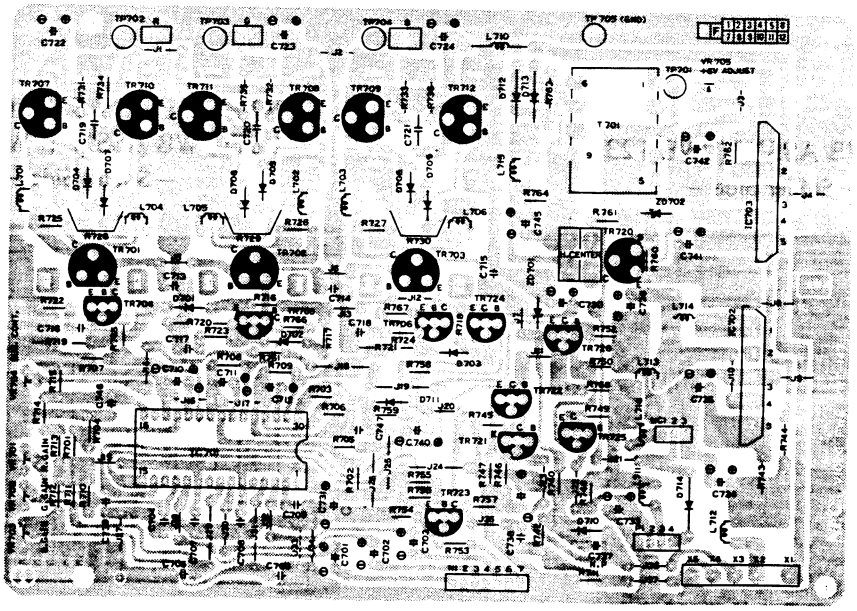
SWITCHING REGULATOR POWER SUPPLY PWB ASS'Y (PWE 142)

— Solder Side —



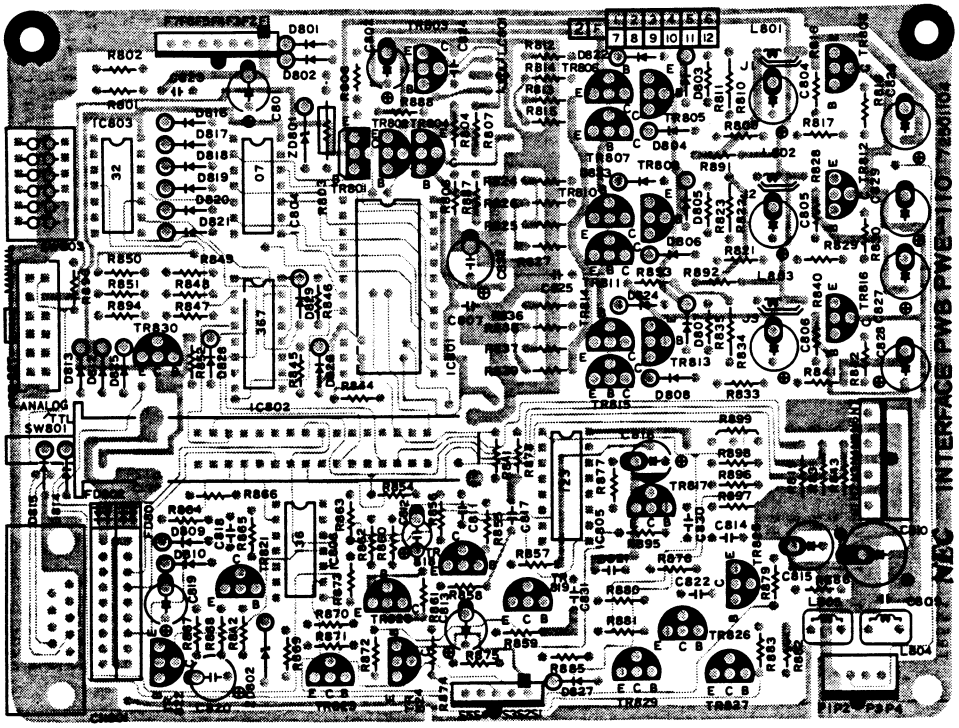
VIDEO PWB ASS'Y (PWE 147)

— Solder Side —



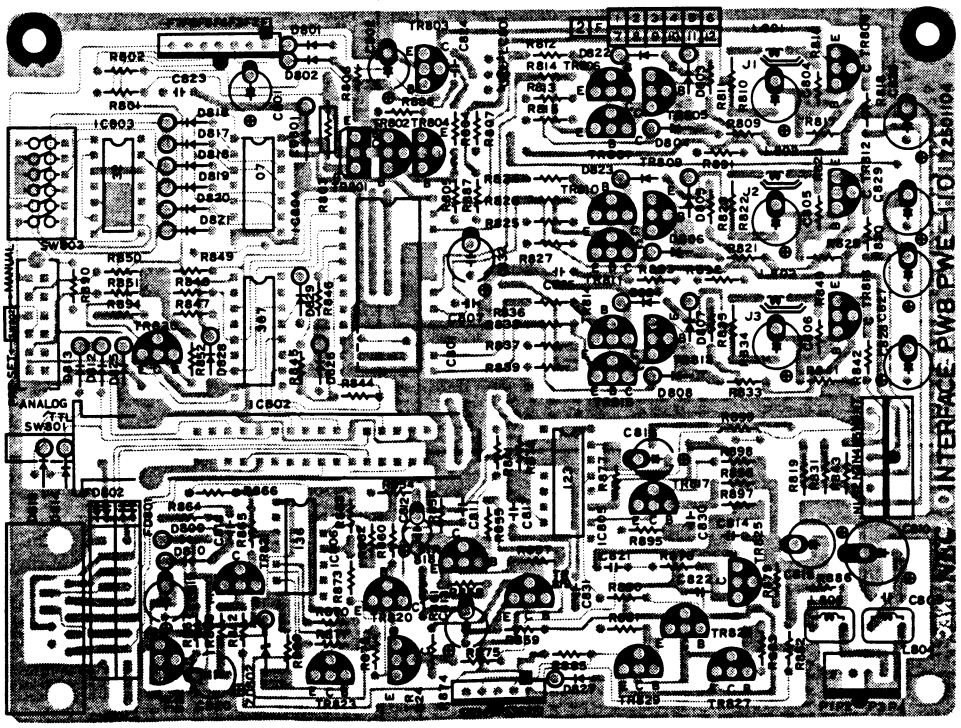
INTERFACE PWB ASS'Y (PWE 110)

– Component Side –



INTERFACE PWB ASS'Y (PWE 110)

See-through view of reverse-side components



REPLACEMENT PARTS LIST

Note: The components identified by △ make are critical for safety. Replace only with Parts Number Specified.

SYMBOL	PARTS NO	DESCRIPTION	QTY
*** CRT & TUNER ***			
△CPT(JC-1401P3E)	33014117	CRT 370HYB22-TC126 (PN2)	1
△ (JC-1401P3EE)	33014117	CRT 370HYB22-TC126 (PN2)	1
△ (JC-1401P3R)	33014124	CRT370HYB22-TC126(PN2)(R)	1
*** ICS ***			
IC552 IC554	37011010	IC UPC4557C (OP-AMP)	2
IC553	37011054	IC UPC339C (COMP)	1
IC451 IC555	37051036	MOS UPD4066BC (ESD)	2
IC803	37051081	IC SN74LS32N (OR)	1
IC802	37051096	IC SN74LS367AN (BUFF)	1
IC804	37051108	IC SN7407N (BUFF)	1
IC805	37051179	IC SN74LS123N (MONO MLT)	1
IC806	37052011	IC SN74LS136N (EX-OR)	1
IC402	37056216	IC LA78??	1
△IC401	37056217	IC LA7850	1
IC551	37056218	IC IR9331	1
IC703	37056219	IC STR2005	1
IC702	37056220	IC STR2012	1
IC301	37056273	IC PCD-016MI	1
IC701	37056245	IC M51327P	1
△IC601 △IC602	37056250	IC STK-7404H-105	2
*** TRANSISTORS ***			
△TR2002 TR401 TR404 TR501 TR504 TR552	35067217	TR,2SC945-T Q	28
△TR553 TR722 TR726 TR802 TR804 TR808 TR812 TR816 TR817 TR818 TR819 TR821 TR822 TR823 TR824 TR825 TR826 TR827 TR829 TR830 TR904 TR909			
TR704 TR705 TR706 TR723 TR805 TR806 TR807 TR809 TR810 TR811 TR813 TR814 TR815 TR820	35065017	TR,2SC3911-TA Q	14
△TR2001 TR721 TR724 TR725 TR803	35063517	TR 2SA733/2SA733A Q	5
TR402	35064412	TR,2SA952 L	1
TR405	35064312	TR,2SA953 L	1
TR901 TR902 TR903 TR710 TR711 TR712	35065217	TR,2SA1015 O	3
	35066004	TR,2SA1536-RA D	3
△TR601 △TR602	35047216	TR,2SC945 P	2
△TR651 △TR652 △TR653	35053011	TR,2SC1941 K	3
TP402	35055312	TR 2SC2001 L	1
TR502	35056311	TR,2SC2688 K	1
TR801	35063511	TR 2SD471 (1) K	1
TR551	35065416	TR,2SD882 P	1
TR720	35065417	TR,2SD882 Q	1
△TR503	35062401	TR 2SC3486-YR	1
TR701 TR702 TR703	35062505	TR,2SC3502 E	3
TR905 TR906 TR907	35064417	TR,2SC1473 Q	3
TR707 TR708 TR709	35066004	TR,2SC3957-RA D	3
△TR557 △TR558	35121000	TR,2SK430	2
△TR554 △TR555	35121200	TR,2SK320	2
△CR602 △CR603	35595010	THYRISTOR C7P4M-L	2
△CR601	35595011	TRIAC FCR4AM-12L	1
*** DIODES ***			
D701 D702 D703 D704 D705 D706 D707 D708 D709 D711 D710	360K1000	DIODE,SI.1S2473	10
△D2006 D401 D402 D403 D405 D406 D551 D552 D553 D557 D801 D802 D803 D804 D805 D806 D807 D808 D809 D810 D812 D813 D814 D815 D816 D817 D818 D819 D820 D821 D822 D823 D824 D825 D826 D827 D828 D829	360K1010	DIODE,SI.1S2472	1
	360K1027	DIODE 1SS133	38
D607 D608 D901 D902 D903	360K1032	DIODE 1SS82-TA	5
△D609 △D610 △D653 △D654 △D658 △D659 △D661 △D662 △D663	360K1528	DIODE 1S954-T4	9
ZD801	360K3112	DIODE RD9.1EB (3)-T4	1
ZD702	360K3121	DIODE RD6.8EB(3)-T4	1
ZD402	360K3123	DIODE RD20EB(?)	1
ZD701	360K3124	DIODE RD8.2EB (3)-T4	1
△D604	360K3129	DIODE,RD27EB(4)-T4	1
△D605	360K3133	DIODE,RD7.5EB(2)-T4	1
△ZD2001△ZD2002 ZD551	360K3143	DIODE,RD8.2JSB(1)-T4	3
△D602	360K3149	DIODE RD10EB(2)-T4	1
△D655 △D660	360K3151	DIODE RD6.8EB(2)-T4	2

SYMBOL	PARTS NO	DESCRIPTION	QTY
ZD403	36GK3160	DIODE RD8.2EB(2)-T4	1
△D611	36GK3162	DIODE,RD2.7EB(1)-T4	1
ZD401	36GK3188	DIODE RD3.9EB(2)-T4	1
ZD802	36GC3100	DIODE RD5.1EB-2	1
ZD552	36GC3147	DIODE RD18EB(1)	1
△D2001 △D2004 △D2007 D404 D505 △D554 △D555 D712 D713 D714	361K7160	RECTIFIER,SI. TVP-06G G23	10
D502 D503	361K7505	RECTIFIER,SI.FRB44-06V1	2
△D403 △D606	36107174	RECTIFIER,SI. RU1P	2
△D651	36107180	DIODE RU3AM,LFB2	1
△D501	36107509	DIODE RH4F	1
△D652	36107511	RECTIFIER,SI. RL4Z,LFK2	1
△D657	36107512	RECTIFIER,SI. RG4C,LFK2	1
△D601	36108009	DIODE,RB-40C BRIDGE	1
FD902	36108054	DIODE ARRAY 1S2473*7A	1
FD301	36108055	DIODE ARRAY 1S2473*7K	1
D1 D2 D3	36801046	DIODE,LIGHT-E SG235D	3
△D2002 △D2005	38005011	VARISTER,VD1220	2
△TH601	38112031	THERMISTOR,POSITIVE	1
△PC601 △PC602	38200233	IC TLP634(GR-LF2)	2

*** TRANSFORMERS ***

SYMBOL	PARTS NO	DESCRIPTION	QTY
T501	45803008	TRANSFORMER	1
T701	46305101	TRANS,CONVERTER	1
△TA01	46308402	TRANS,SWITCHING	1
△T602	46308403	TRANS,SWITCHING	1
△T502	47105628	F.B.T	1
△T503	47502042	TRANS,SIDE PINCUSHION	1

*** VARIABLE RESISTORS ***

SYMBOL	PARTS NO	DESCRIPTION	QTY
VR5	41011270	R,VARIABLE B500-V(M)	1
VR1 VR2	41011271	R,VARIABLE B10K-V(M)	2
VR3	41011273	R,VARIABLE B20K-V(M)	1
VR6	41011274	R,VARIABLE B200K-V(M)	1
VR4	41011275	R,VARIABLE B20K-V(M)	1
VR401	41061006	R,VARIABLE B100K	1
VR404	41061007	R,VARIABLE B470H	1
VR402 VR403	41061013	R,VARIABLE B220H	2
VR405	41061614	R,VARIABLE B100K	1
VR552	41067027	R,VARIABLE B3K	1
VR551	41067105	R,VARIABLE 1K 0.1W	1
VR502	41067108	R,VARIABLE B5K	1

SYMBOL	PARTS NO	DESCRIPTION	QTY
VR704	41071160	R,VARIABLE B3.3K	1
VR701 VR702 VR703	41071161	R,VARIABLE B4.7K	3
VR901 VR902 VR903 VR904 VR905 VR906	41071169	R,VARIABLE B100K	6
VR451 VR452	41085005	R,VARIABLE B1K	2
VR705	41085008	R,VARIABLE B5K	1
VR501 VR553	41085012	R,VARIABLE B50K	2
VR554	41085013	R,VARIABLE B100K	1
VR555	41085016	R,VARIABLE B500K	1
△VR651	41087058	R,VARIABLE B5K	1
△VR2002 △VR2003 △VR652	41505005	R,VARIABLE B2K	3
△VR653	41505007	R,VARIABLE B5K	1
△VR2001	41505008	R,VARIABLE B10K	1

*** RELAYS & SWITCHES ***

SYMBOL	PARTS NO	DESCRIPTION	QTY
SW802	65163001	SWITCH,SLIDE	1
SW2 SW3	65163002	SWITCH,SLIDE	2
SW801	65169001	LEVER SWITCH,SLIDE	1
	65260002	SWITCH,SEF-S4W	1
△RL501	65602501	RELAY G6B-1114P	1
SW803	66098006	SW,LEVER SDLP06CP	1

*** COILS & FILTERS ***

SYMBOL	PARTS NO	DESCRIPTION	QTY
△L505	60908043	COIL,VARIABLE WIDTH	1
△L506	60908047	COIL,WIDTH	1
△L504	60918101	COIL,H.LIN	1
L507	60999004	COIL,CHOKE	1
L901 L902 L903	610E1711	COIL,FILTER 3.3UH	3
L716 L804 L805	610E1714	COIL,FILTER 5.6UH	3
L710	610E6014	COIL,FILTER 5.6UH	1
L503	610E7010	COIL,FILTER 2.7UH	1
L714	61022081	COIL (SF471M1P0)	1
L701 L702 L703 L704 L705 L706	61051710	COIL,FILTER 2.7UH	6
△L601	61062040	LINE FILTER (12MH-1.3A)	1
△	61062057	LINE FILTER	1
L501 L711 L712	61064006	COIL,FILTER 500UH	3
△L651 △L653 L713 L715	61099011	COIL,CHOKE 330H	2
△L602 △L652	61099019	COIL,CHOKE	2
△DEG	61099020	COIL,CHOKE	2
LC401	61314209	COIL,DEGAUSSING	1
LC801	61606022	NOIZE FILTER DSS-222M	1
	61606023	FILTER DSS-223S	1

SYMBOL	PARTS NO	DESCRIPTION	QTY
		*** PWB ASSYS ***	
△	84J71A01	SW.REG.PWB ASSY	1
	84J71C01	VIDEO PWB ASSY	1
	84J71D01	DEF PWB ASSY	1
	84J71J01	CRT PWB ASSY	1
	84J71K01	INTERFACE PWB ASSY	1
	84J71L01	CONTROL PWB ASSY	1
		*** ELECTRICAL PARTS & MISCELLANEOUS PARTS ***	
	31709201	INSULATOR SHEET	1
HS-402	31709202	SHEET,INSULATOR	1
△F601	66699007	FUSE ET T2A,250V-S,P SOC	1
△F651	66699009	FUSE T1.25A 250-SP	1
SG901 SG902 SG903 SG905	66706001	SPARK GAP 1.2KV	4
△			
CN1	70032223	SG/CRT SOCKET	1
	70056331	D-SUB SOCKET 9PL	1
IS701	70102137	IC SOCKET 24P	1
	70102152	IC SOCKET 30P	1
	70301513	RUBBER,WEDGE	1
(JC-1401P3E)	70800031	POWER CORD (E)	1
(JC-1401P3EE)	75513006	LINE CORD SAA L2.0	1
(JC-1401P3R)	70800321	POWER CORD	1
	71205027	HOLDER,FUSE	4
CN-CE CN-H CN-M1	73721003	CONNECTOR PIN 2P	3
	73893017	CABLE,SIGNAL	1
		*** APPEARANCE PARTS ***	
	24514792	COIL SPRING	1
	25305822	CABINET BACK ASSY	1
	25305832	CABINET FRONT ASSY	1
	25404081	ESCUTCHEON,CONTROL	1
	25404111	REVOLVING STAND (T)	1
	25404121	LID,CONTROL	1
(JC-1401P3E)	25405021	REVOLVING STAND(R)ASSY	1
(JC-1401P3EE)	25405151	REVOLVING STAND(R) ASSY	1
(JC-1401P3R)	25405131	REVOLVING STAND(R)ASSY	1
(JC-1401P3E)	25763141	NAME PLATE,INSTRUCTION	1
(JC-1401P3EE)	25763371	NAME PLATE,INSTRUCTION	1
(JC-1401P3R)	25763361	NAME PLATE,INSTRUCTION	1
		*** PRINTED & PACKING MATERIALS ***	
	24813191	BAG,POLYETHYLENE	1
	25804501	SERVICE ENVELOPE	1
	25810221	FILLER(L),CARTON	1
	25810231	FILLER(R),CARTON	1
	25810711	FILLER(T),CARTON	1
	25811351	CARTON BOX	1

SYMBOL	PARTS NO	DESCRIPTION	QTY
(JC-1401P3R.only)	78043391	WARRANTY CARD	1
	78118111	INSTRUCTION BOOK	1
	599910250	SERVICE MANUAL	1
		*** RESISTORS ***	
△R626	401C6657	R,CARBON 220H 5% 1/4W	1
△R658	401C6661	R,CARBON 330H 5% 1/4W	1
△R602 △R608 △R611 △R619 △R663	401C6673	R,CARBON 1.0K 5% 1/4W	5
△R609 △R620	401C6675	R,CARBON 1.2K 5% 1/4W	2
△R662	401C6679	R,CARBON 1.8K 5% 1/4W	1
△R631	401C6681	R,CARBON 2.2K 5% 1/4W	1
△R612 △R666	401C6687	R,CARBON 2.7K 5% 1/4W	2
△R628 △R633 △R656 △R661	401C6685	R,CARBON 3.3K 5% 1/4W	4
△R636 △R655	401C6691	R,CARBON 5.6K 5% 1/4W	2
△R627 △R664	401C6709	R,CARBON 33K 5% 1/4W	2
△ R657	401C6723	R,CARBON 120K 5% 1/4W	1
R564 R568 R572	401C6761	R,CARBON 4.7M 5% 1/4W	3
R521	401H5623	R,CARBON 8.2H 5% 1/2W	1
R904 R905 R906	401H5649	R,CARBON 100H 5% 1/2W	3
R719 R720 R721	401H5651	R,CARBON 120H 5% 1/2W	3
R408	401H5665	R,CARBON 470H 5% 1/2W	1
△ R597	401H5669	R,CARBON 680H 5% 1/2W	1
R419	401H5673	R,CARBON 1.0K 5% 1/2W	1
R518	401H5689	R,CARBON 4.7K 5% 1/2W	1
△R605 △R606	401H5735	R,CARBON 390K 5% 1/2W	2
△ R603	401H5743	R,CARBON 820K 5% 1/2W	1
△ R618	401H5753	R,CARBON 2.2M 5% 1/2W	1
R886	401K5601	R,CARBON 1H 5% 1/6W	1
R769	401K5625	R,CARBON 10H 5% 1/6W	1
R761	401K5641	R,CARBON 47H 5% 1/6W	1
R716 R717 R718 R722 R723 R724	401K5647	R,CARBON 82H 5% 1/6W	6
R429 R430 R760	401K5649	R,CARBON 100H 5% 1/6W	3
R420 R740 R858	401K5657	R,CARBON 220H 5% 1/6W	3
R405 R864 R935	401K5661	R,CARBON 330H 5% 1/6W	3
R517 R707 R708 R709	401K5665	R,CARBON 470H 5% 1/6W	4
R406 R575 R765 R766 R767 R759	401K5667	R,CARBON 560H 5% 1/6W	5
R501 R507 R512	401K5669	R,CARBON 680H 5% 1/6W	1
R516 R534 R745	401K5673	R,CARBON 1.0K 5% 1/6W	18
R746 R751 R762			
R806 R809 R821			
R833 R894 R901			
R902 R903 R934			

SYMBOL			PARTS NO	DESCRIPTION	QTY
R435	R503	R801	401K5675	R,CARBON 1.2K 5% 1/4W	5
R832	R890				
R410	R532	R757	401K5677	R,CARBON 1.5K 5% 1/4W	9
R813	R815	R825			
R827	R837	R839			
△R2002	R742		401K5679	R,CARBON 1.8K 5% 1/4W	2
R588	R596	R725	401K5681	R,CARBON 2.2K 5% 1/4W	16
R726	R727	R756			
R804	R805	R857			
R859	R863	R864			
5871	R879	R882			
R931					
R747	R748	R749	401K5683	R,CARBON 2.7K 5% 1/4W	10
R750	R753	R760			
R862	R867	R869			
R929					
△R2005	△R2009	R411	401K5685	R,CARBON 3.3K 5% 1/4W	17
R438	R710	R711			
R712	R741	R817			
R829	R841	R861			
R862	R874	R899			
R922	R939				
R574	R556	R807	401K5687	R,CARBON 3.9K 5% 1/4W	4
R887					
R409	R554	R878	401K5689	R,CARBON 4.7K 5% 1/4W	3
R421	R422	R590	401K5691	R,CARBON 5.6K 5% 1/4W	18
R754	R944	R945			
R946	R947	R948			
R949	R950	R951			
R960	R970	R974			
R980	R987	R988			
△R2004	△R2008	R591	401K5693	R,CARBON 6.8K 5% 1/4W	3
R419	R511	R537	401K5695	R,CARBON 8.2K 5% 1/4W	14
R752	R758	R764			
R816	R822	R840			
R845	R872	R873			
R891	R895				
△R2003	△R2006	△R2010	401K5697	R,CARBON 10K 5% 1/4W	16
R414	R517	R531			
R551	R552	R558			
R592	R755	R941			
R952	R954	R975			
R990					
△R2011	R506	R568	401K5699	R,CARBON 12K 5% 1/4W	5
R827	R921				
R412	R563	R567	401K5701	R,CARBON 15K 5% 1/4W	6
R571	R574	△R595			
R425			401K5703	R,CARBON 18K 5% 1/4W	1
R403	R422	R429	401K5705	R,CARBON 22K 5% 1/4W	6
R505	R508	R599			
R557			401K5707	R,CARBON 27K 5% 1/4W	1
R415	R510	R593	401K5709	R,CARBON 33K 5% 1/4W	9

SYMBOL			PARTS NO	DESCRIPTION	QTY
R917	R918	R919	401K5709	R,CARBON 33K 5% 1/4W	9
R923	R924	R925			
R436	R877		401K5713	R,CARBON 47K 5% 1/4W	2
R404	R860		401K5715	R,CARBON 56K 5% 1/4W	2
R926	R927	R928	401K5717	R,CARBON 68K 5% 1/4W	3
R431	R509	R555	401K5719	R,CARBON 82K 5% 1/4W	4
R855					
R417	R437	△R596	401K5721	R,CARBON 100K 5% 1/4W	3
R553			401K5723	R,CARBON 120K 5% 1/4W	1
R402	R914	R915	401K5727	R,CARBON 180K 5% 1/4W	4
R916					
R530	R896	R908	401K5729	R,CARBON 220K 5% 1/4W	5
R909	R910				
R911	R912	R913	401K5731	R,CARBON 270K 5% 1/4W	3
R432			401K5743	R,CARBON 820K 5% 1/4W	1
R536			401K5745	R,CARBON 1.0M 5% 1/4W	1
R1003			40107149	R,CARBON 100M 5% 1/4W	1
R1004			40107189	R,CARBON 4.7K 5% 1/4W	1
R1002			40107201	R,CARBON 15K 5% 1/4W	1
R433			40136189	R,CARBON 4.7K 5% 1/4W	1
R434			40136713	R,CARBON 47K 5% 1/4W	1
R587			40175117	R,CARBON 4.7M 5% 1/4W	1
R414			40175133	R,CARBON 22M 5% 1/4W	1
△R630	△R632	△R634	40175143	R,CARBON 56M 5% 1/4W	3
△R614			40175191	R,CARBON 2.2K 5% 1/4W	1
△R623			40175189	R,CARBON 4.7K 5% 1/4W	1
△R763			40177109	R,CARBON 2.2M 5% 1/4W	1
△R731	△R732	△R733	40177141	R,CARBON 47M 5% 1/4W	6
△R734	△R735	△R736			
△R743			40178117	R,CARBON 4.7M 5% 1/2W	1
R728	R729	R730	40318179	R,METAL 1.8K 5% 5W	3
R526			40371137	R,METAL 33M 5% 1W	1
R803			40371161	R,METAL 330M 5% 1W	1
△R615	△R624		40372107	R,METAL 1.8M 5% 2W	2
R407			40372113	R,METAL 3.3M 5% 2W	1
△R667			40372137	R,METAL 33M 5% 2W	1
△R613			40372145	R,METAL 68M 5% 2W	1
△R607	△R622		40372147	R,METAL 82M 5% 2W	2
△R616	△R625		40372149	R,METAL 100M 5% 2W	2
R401	R413		40372157	R,METAL 220M 5% 2W	2
△R652			40372203	R,METAL 19K 5% 2W	1
△R654			40372205	R,METAL 22K 5% 2W	1
△R665			40372209	R,METAL 33K 5% 2W	1
R519			40373163	R,METAL 390M 5% 3W	1
R520			40373165	R,METAL 470M 5% 3W	1
△R610			40373181	R,METAL 2.2K 5% 3W	1
△R653			40373195	R,METAL 8.2K 5% 3W	1

SYMBOL	PARTS NO	DESCRIPTION	QTY
△R660	40373197	R/METAL 10K 5% 3W	1
△R659 △R670	40373207	R/METAL 19K 5% 3W	2
△R617 △R629	40373221	R/METAL 100K 5% 3W	2
△R604	40399031	R/METAL 2.2K 5% 2W	1
△R601	40399032	R/METAL 10H 5% 5W	1
R819 R830 RR42	404C1650	R/METAL 110H 1% 1/4W	3
R713	404C1657	R/METAL 220H 1% 1/4W	1
R812 R814 R824	404C1669	R/METAL 680H 1% 1/4W	6
R826 R836 R83P			
R811 R823 R835	404C1670	R/METAL 750H 1% 1/4W	3
R715	404C1691	R/METAL 5.6K 1% 1/4W	1
R714	404C1695	R/METAL 8.2K 1% 1/4W	1
R711 R702 R703	404C1697	R/METAL 10K 1% 1/6W	6
R714 R705 R706			
R514 R515 R560	404C1699	R/METAL 12K 1% 1/6W	3
R559	404C1704	R/METAL 20K 1% 1/6W	1
R584	404C1713	R/METAL 47K 1% 1/6W	1
R576	404C1717	R/METAL 68K 1% 1/6W	1
R579	404C1719	R/METAL 75K 1% 1/6W	1
R591 R586 R587	404C1721	R/METAL 100K 1% 1/6W	3
R562 R566 R569	404C1727	R/METAL 120K 1% 1/6W	4
R577			
R570	404C1724	R/METAL 130K 1% 1/6W	1
R565	404C1729	R/METAL 200K 1% 1/6W	1
R573	404C1731	R/METAL 270K 1% 1/6W	1
R578	404C1737	R/METAL 470K 1% 1/6W	1
R819 R831 R843	404R2647	R/METAL 82H 1% 1/4W	3
R810 R822 R834	404R2653	R/METAL 150H 1% 1/4W	3
△R2001 △R2007 △R523	404C5109	R/METAL 2.2H 5% 1/4W	3
△R522	404C5117	R/METAL 4.7H 5% 1/4W	1
R423	404C0153	R/METAL 150H 1% 1/4W	1
△R525	40812661	R/FUSE 330H 5% 1/2W	1
△R524	40812665	R/FUSE 470H 5% 1/2W	1
△R744	40822609	R/FUSE 2.2H 5% 1/2W	1

*** CAPACITORS ***

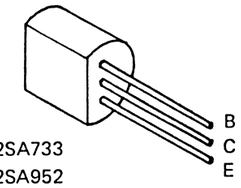
C412			42009551	C/CERAMIC 500V 100PF	1
C524			42009555	C/CERAMIC 500V 220PF	1
△C521			42009557	C/CERAMIC 500V 330UF	1
C411	C420	C510	42009560	C/CERAMIC 500V 560PF	4
△C520					
C512	C912	C913	42009567	C/CERAMIC 500V 0.001UF	4
C914					
C905	C906	C907	42009567	C/CERAMIC 500V 2200PF	4
C908					
C511	C719	C720	4201J575	C/CERAMIC 500V 0.01UF	4

SYMBOL			PARTS NO	DESCRIPTION	QTY
C721			4201J575	C/CERAMIC 500V 0.01UF	4
C911			42019175	C/CERAMIC 2KV 0.01UF	1
△C626			4203J554	C/CERAMIC 500V 180PF	1
△C603	△C604		42053013	C/CERAMIC 400V 1000PF	2
△C606			42053067	C/CERAMIC 400V 2200PF	1
△C663			42099082	C/CERAMIC 2KV 1500PF	1
△C622	△C623	△C624	42099085	C/CERAMIC 2KV 560PF	4
△C625					
△C612	△C618		42099088	C/CERAMIC 2KV 220PF	2
△C530	C559	C560	421A0425	C/CERAMIC 50V 0.01UF	13
C561	C704	C705			
C706	C707	C708			
C709	C807	C809			
C814					
C566			421C0212	C/CERAMIC 50V 820PF	1
C419	C527	C567	421C0213	C/CERAMIC 50V 1000PF	3
C531			42105014	C/CERAMIC 50V 0.01UF	1
C713	C714	C715	421J9001	C/CERAMIC 50V 0.1UF	12
C739	C746	C818			
C823	C824	C825			
C831	C915	C916			
C904	C909		421J9035	C/CERAMIC 16V 0.1UF	2
C568			4213K211	C/CERAMIC 50V 680PF	1
C1001			4219J002	C/CERAMIC 50V 0.1UF	1
C748			4219J035	C/CERAMIC 16V 0.1UF	1
C501	C562		423A1045	C/CERAMIC 50V 100PF	2
C503			423A1055	C/CERAMIC 50V 270PF	1
C811			423A1074	C/CERAMIC 50V 270PF	1
C830			423A2027	C/CERAMIC 50V 18PF	1
C716	C717	C718	423A2043	C/CERAMIC 50V 82PF	3
C563			427A7005	C/FILM 100V 0.0022UF	1
C508			427A7007	C/FILM 100V 0.0033UF	1
C502			427F4001	C/FILM 50V 1000PF	1
C565			427F4005	C/FILM 50V 2200PF	1
C404			427F4013	C/FILM 50V 0.01UF	1
C405			427F4017	C/FILM 50V 0.022UF	1
C403			427F4025	C/FILM 50V 0.1UF	1
C817	C822		427F4051	C/FILM 50V 1000PF	2
C402			427F4052	C/FILM 50V 1200PF	1
C551	C821		427F4053	C/FILM 50V 1500PF	2
C504			427F4061	C/FILM 50V 6800PF	1
C506			427F4063	C/FILM 50V 0.01UF	1
C406	C423		427F4071	C/FILM 50V 0.047UF	2
C421	C526	C738	427F4075	C/FILM 50V 0.1UF	3
△C529			42703863	C/MYLAR 400V 0.01UF	1
△C515			42703866	C/FILM 400V 0.01UF	1
C517			42754267	C/FILM 200V 0.022UF	1

SYMBOL	PARTS NO	DESCRIPTION	QTY
⚠C608 ⚠C614	427cD063	C/FILM 50V 0.01UF	2
⚠C656	4276D073	C/FILM 50V 0.068UF	1
⚠C607	4276D075	C/FILM 50V 0.1UF	1
⚠C655	4279J059	C/FILM 100V 5600PF	1
⚠C613 ⚠C619 ⚠C659	42799099	C/MYLAR 400V 0.033UF	3
⚠C514	4280T511	C/METAL FILM 1.6KV 2700PF	1
⚠C513	4280T512	C/METAL FILM 1.6K 3900PF	1
⚠C2006 ⚠C2007 C528	4282C025	C/METAL FILM 50V 1UF	3
⚠C602	42824325	C/FILM 250V 0.1UF	1
⚠C601	42824329	C/FILM 250V 0.22UF	1
⚠C661	42839021	C/METAL FILM 250V 0.068UF	1
C901 C902 C903	42899010	C/METAL FILM 250V 0.22UF	3
⚠C522 ⚠C557 ⚠C558	42899042	C/METAL FILM 400V 0.64UF	3
C505 C507	430A4105	C/ELEC 50V 1UF	2
C730	430A9014	C.ELEC 10V 33UF	1
⚠C2002 ⚠C2005	430A9015	C/ELEC 10V 47UF	2
C745 C815	430A9017	C/ELEC 10V 220UF	2
C812 C813 C829	430A9025	C.ELEC 16V 10UF	3
C701 C702 C707	430A9029	C/ELEC 16V 47UF	5
C836 C827			
C401 C740 C801	430A9039	C/ELEC 16V 100UF	3
C810	430A9040	C/ELEC 16V 220UF	1
C731	430A9042	C/ELEC 16V 470UF	1
C564	430A9039	C.ELEC 25V 22UF	1
C424 C553	430A9041	C.ELEC 25V 47UF	2
C414	430A9042	C/ELEC 25V 100UF	1
C410 C422 C735	430A9054	C/ELEC 35V 100UF	3
C733 C819	430A9061	C/ELEC 50V 1UF	2
C710 C711 C712	430A9062	C.ELEC 50V 2.2UF	4
C820			
⚠C2004	430A9065	C/ELEC 50V 10UF	1
C832 C833	430E3030	C/ELEC 10V 100UF	2
C804 C805	430E3049	C/ELEC 16V 47UF	2
C415	430E3102	C/ELEC 50V 1UF	1
⚠C2001	430E3109	C/ELEC 50V 47UF	1
C722 C723 C724	430E3152	C/ELEC 160V 1UF	3
C518	4300E135	C/ELEC 200V 10UF	1
C509	4301J030	C/ELEC 16V 220UF	1
C736	4301J044	C/ELEC 25V 330UF	1
C408	4301J046	C/ELEC 25V 1000UF	1
C409 C734	4301J055	C.ELEC 35V 220UF	2
C742	4302C034	C/ELEC 10V 1000UF	1
C741	4302C093	C/ELEC 35V 330UF	1
⚠C660	4302C101	C/ELEC 50V 0.47UF	1
C519	4302C102	C/ELEC 50V 22UF	1
⚠C651	4302C172	C/ELEC 160V 33UF	1
⚠C664	4302C182	C/ELEC 200V 4.7	1

SYMBOL	PARTS NO	DESCRIPTION	QTY
C516 ⚠C657 ⚠C658	4302C190	C/ELEC 160V 100UF	4
⚠C662			
⚠C611 ⚠C617	4302E051	C/ELEC 16V 220UF	2
⚠C610 ⚠C616	4302E053	C/ELEC 50V 470UF	2
⚠C654	4302E090	C/ELEC 35V 100UF	1
⚠C652	4302E093	C/ELEC 35V 470UF	1
⚠C609 ⚠C615	4302E105	C/ELEC 50V 4.7UF	2
⚠C620 ⚠C621	4302E107	C/ELEC 50V 22UF	2
⚠C653	4302E170	C/ELEC 100V 100UF	1
⚠C605	4310B105	C/ELEC 400V 220UF	1
C416	433A3023	C/ELEC 16V 22UF	1
C737	433A3043	C/ELEC 35V 4.7UF	1
C552	435A5073	C/TANTALUM 35V 2.2UF	1
C816	435A7051	C/TANTLUM 16V 2.2UF	1
C413	43950088	C/TANTALUM 35V 0.47UF	1
C407	43950089	C/TANTALUM 35V 0.68UF	1

RUN NO.1



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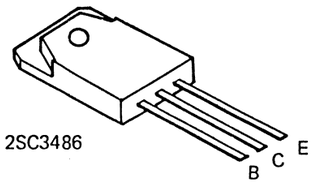
2SA952
2SA953
2SA1018
2SC945
2SC1473
2SC1730
2SC2001



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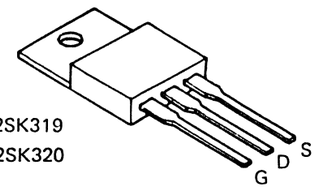
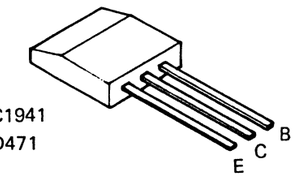
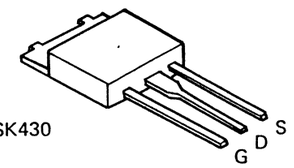


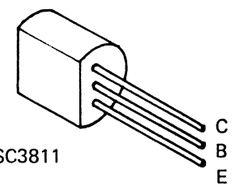
2SK319
2SK320



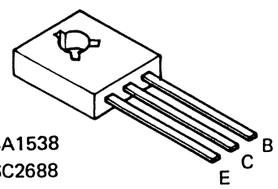
2SC1941
2SD471



2SK430



2SC3811



2SA1538
2SC2688
2SC3502
2SC3953
2SD882

NOTE:

E: EMITTER
B: BASE
C: COLLECTOR
G: GATE
D: DRAIN
S: SOURCE

JC-1401P3E/EE/R
78162041

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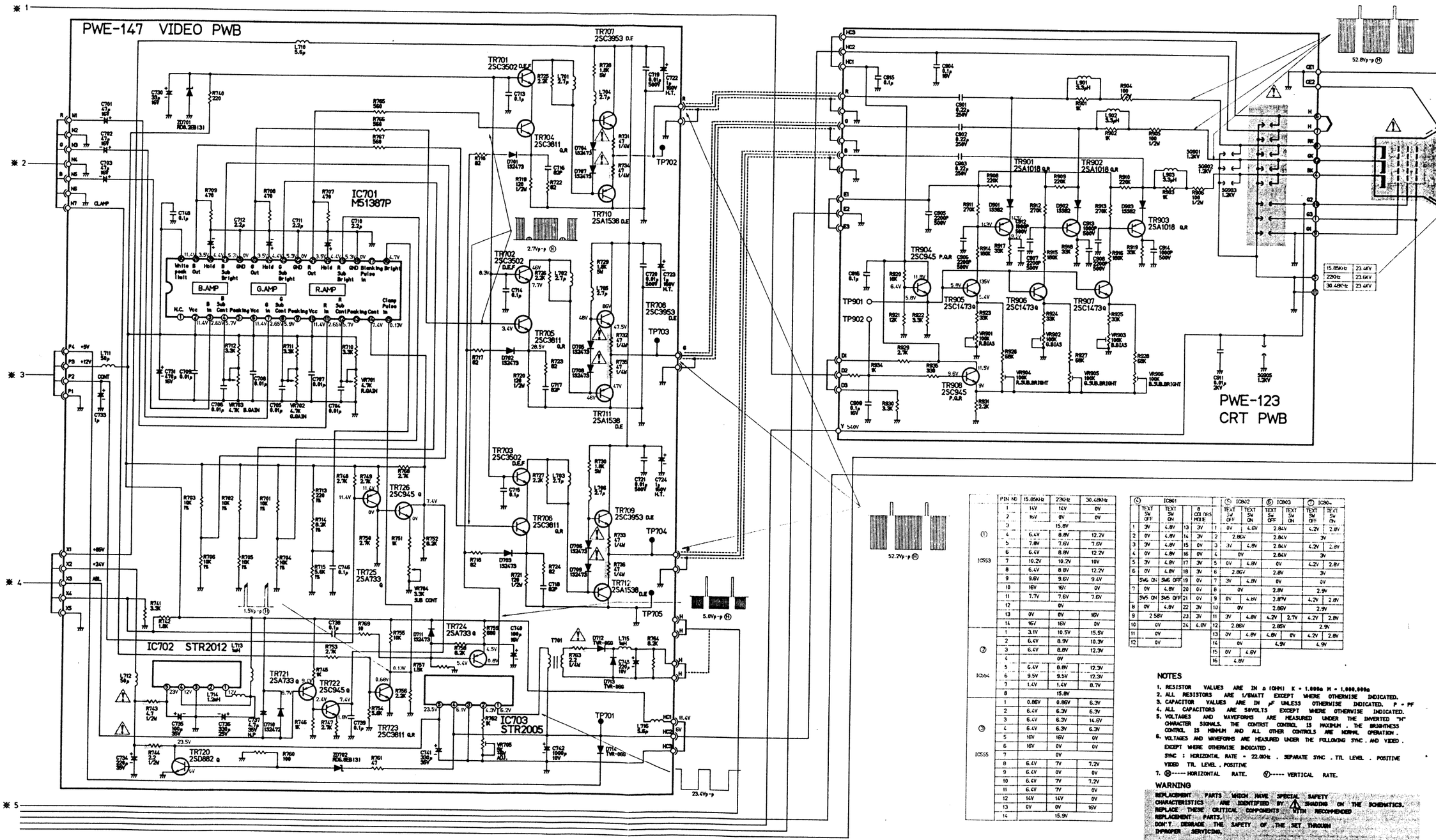


	PIN NO	15.65KHz	22KHz	30.48KHz
① IC553	1	14V	14V	0V
	2	14V	0V	0V
	3	-	15.8V	
	4	6.4V	8.8V	12.2V
	5	7.8V	7.6V	7.6V
	6	6.4V	8.8V	12.2V
	7	10.2V	10.2V	10V
	8	6.4V	8.8V	12.2V
	9	9.6V	9.6V	9.4V
	10	16V	16V	0V
	11	7.7V	7.6V	7.6V
	12		0V	
	13	0V	0V	16V
	14	16V	16V	0V
② IC554	1	3.1V	10.5V	15.5V
	2	6.4V	8.9V	10.3V
	3	6.4V	8.8V	12.3V
	4	-	0V	
	5	6.4V	8.8V	12.3V
	6	9.5V	9.5V	12.3V
	7	1.4V	1.4V	8.7V
	8		15.8V	
③ IC555	1	0.86V	0.86V	6.3V
	2	6.4V	6.3V	6.3V
	3	6.4V	6.3V	14.6V
	4	6.4V	6.3V	6.3V
	5	16V	16V	0V
	6	16V	0V	0V
	7		0V	
	8	6.4V	7V	7.2V
	9	6.4V	0V	0V
	10	6.4V	7V	7.2V
	11	6.4V	7V	0V
	12	14V	14V	0V
	13	0V	0V	16V
	14		15.9V	

	IC801				⑤ IC802		⑥ IC803		⑦ IC804	
	TEXT SW OFF	TEXT SW ON	8 CCI DIS MODE		TEXT SW OFF	TEXT SW ON	TEXT SW OFF	TEXT SW ON	TEXT SW OFF	TEXT SW ON
1	3V	4.8V	13 3V	1	0V	4.6V	2.84V		4.2V	2.8V
2	0V	4.8V	14 3V	2	2.86V		2.84V		3V	
3	3V	4.8V	15 0V	3	3V	4.8V	2.84V		4.2V	2.8V
4	0V	4.8V	16 0V	4	0V		2.84V		3V	
5	3V	4.8V	17 3V	5	0V	4.8V	0V		4.2V	2.8V
6	0V	4.8V	18 3V	6	2.86V		2.8V		3V	
	SW6 ON	SW6 OFF	19 0V	7	3V	4.8V	0V		0V	
7	0V	4.8V	20 0V	8	0V		2.8V		2.9V	
	SW5 ON	SW5 OFF	21 0V	9	0V	4.8V	2.87V		4.2V	2.8V
8	0V	4.8V	22 3V	10	0V		2.86V		2.9V	
9	2.58V		23 3V	11	3V	4.8V	4.2V	2.7V	4.2V	2.8V
10	0V		24 4.8V	12	2.86V		2.85V		2.9V	
11	0V			13	0V	4.8V	4.8V	0V	4.2V	2.8V
12	0V			14	0V		4.9V		4.9V	
				15	0V	4.6V				
				16	4.8V					

NOTES

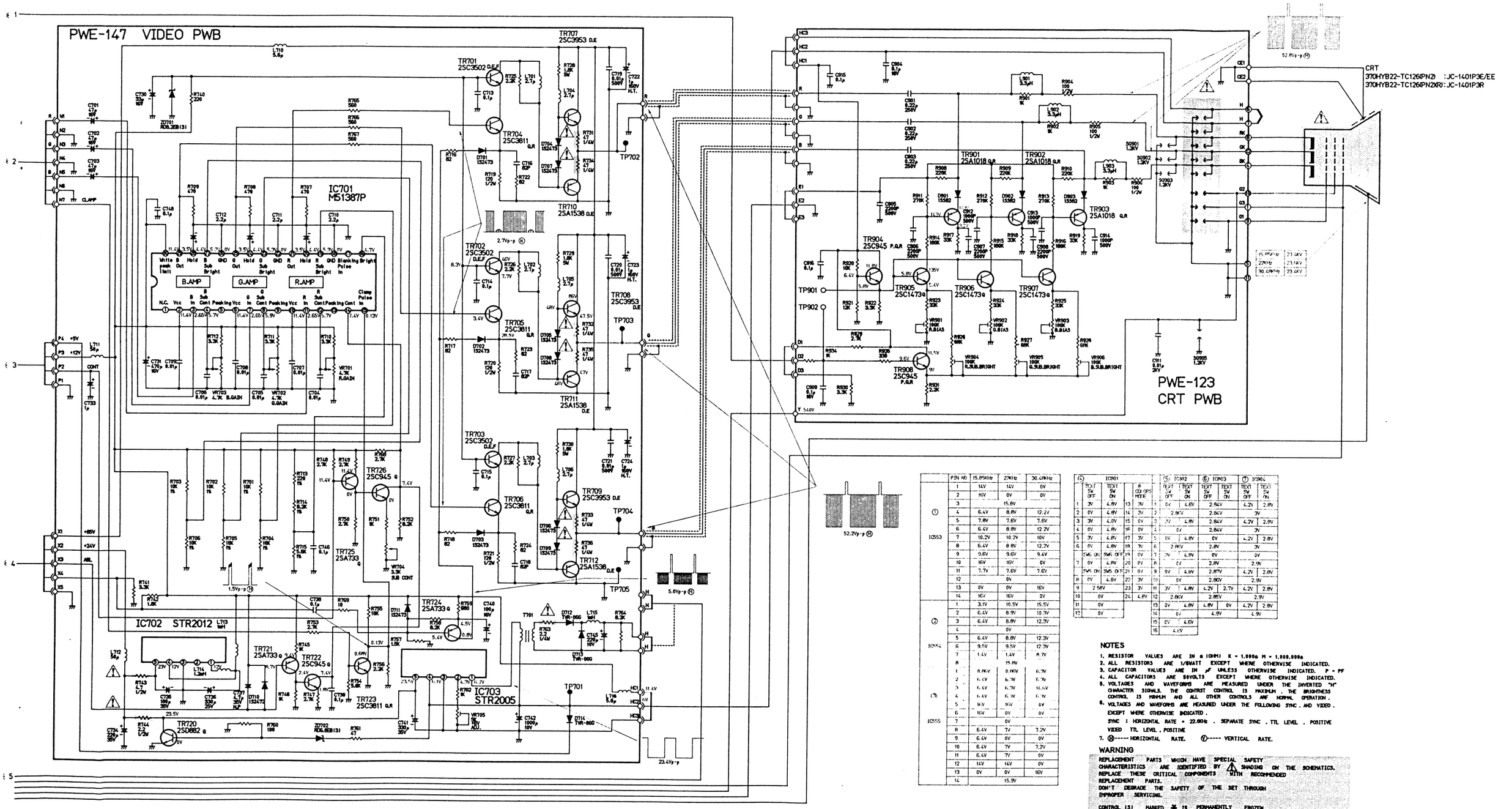
1. RESISTOR VALUES ARE IN Ω (OHM) K = 1,000Ω M = 1,000,000Ω
2. ALL RESISTORS ARE 1/6WATT EXCEPT WHERE OTHERWISE INDICATED.
3. CAPACITOR VALUES ARE IN μF UNLESS OTHERWISE INDICATED. P = PF
4. ALL CAPACITORS ARE 50VOLTS EXCEPT WHERE OTHERWISE INDICATED.
5. VOLTAGES AND WAVEFORMS ARE MEASURED UNDER THE INVERTED "H" CHARACTER SIGNALS. THE CONTRST CONTROL IS MAXIMUM . THE BRUGHTNESS CONTROL IS MINIMUM AND ALL OTHER CONTROLS ARE NORMAL OPERATION .
6. VOLTAGES AND WAVEFORMS ARE MEASURED UNDER THE FOLLOWING SYNC . AND VIDEO . EXCEPT WHERE OTHERWISE INDICATED .
   SYNC : HORIZONTAL RATE = 22.00Hz . SEPARATE SYNC . TTL LEVEL . POSITIVE
   VIDEO TTL LEVEL . POSITIVE
7. Ⓗ----- HORIZONTAL RATE. Ⓥ----- VERTICAL RATE.

WARNING

REPLACEMENT PARTS WHICH HAVE SPECIAL SAFETY CHARACTERISTICS ARE IDENTIFIED BY ⚠ SHADING ON THE SCHEMATICS. REPLACE THESE CRITICAL COMPONENTS WITH RECOMMENDED REPLACEMENT PARTS. USE OF SUBSTITUTE REPLACEMENT PARTS MAY DEGRADE THE SAFETY OF THE SET THROUGH IMPROPER SERVICING.

CONTROL (S) MARKED ✱ IS PERMANENTLY FROZEN. DO NOT ATTEMPT TO DEFEAT OR IMPROPERLY REPLACE.

THIS SCHEMATIC DIAGRAM IS FUNDAMENTAL AND SUBJECT TO CHANGE.



P/N NO	15.850kHz	27kHz	30.4kHz
1	14V	14V	0V
2	16V	0V	0V
3		15.8V	
4	6.4V	8.8V	12.2V
5	7.8V	7.6V	7.6V
6	6.4V	8.8V	12.2V
7	10.2V	10.2V	10V
8	6.4V	8.8V	12.2V
9	9.6V	9.6V	9.4V
10	16V	16V	0V
11	7.7V	7.6V	7.6V
12		0V	
13	0V	0V	16V
14	16V	16V	0V
1	3.1V	10.5V	15.5V
2	6.4V	8.9V	10.3V
3	6.4V	8.8V	12.3V
4		0V	
5	6.4V	8.8V	12.3V
6	9.5V	9.5V	12.3V
7	1.4V	1.4V	8.7V
8		15.8V	
1	0.86V	0.86V	6.7V
2	6.4V	6.7V	6.7V
3	6.4V	6.7V	14.4V
4	6.4V	6.7V	6.7V
5	9V	9V	0V
6	16V	0V	0V
7		0V	
8	6.4V	7V	7.2V
9	6.4V	0V	0V
10	6.4V	7V	7.2V
11	6.4V	7V	0V
12	14V	14V	0V
13	0V	0V	16V
14		15.9V	

④ IC801	TEXT SW OFF	TEXT SW ON	8 CLI OPS MODE
1	3V	4.6V	3V
2	0V	4.6V	3V
3	3V	4.6V	3V
4	0V	4.6V	3V
5	3V	4.6V	3V
6	0V	4.6V	3V
7	SWS ON	SWS OFF	0V
8	0V	4.6V	0V
9	SWS ON	SWS OFF	0V
10	0V	4.6V	3V
11	2.58V		3V
12	0V		4.6V
13	0V		
14	0V		

⑤ IC802	TEXT SW OFF	TEXT SW ON
1	0V	4.6V
2	2.86V	
3	3V	4.8V
4	0V	
5	0V	4.8V
6	2.86V	
7	0V	4.8V
8	0V	
9	0V	4.8V
10	0V	
11	3V	4.8V
12	2.86V	
13	3V	4.8V
14	0V	
15	0V	4.6V
16	4.6V	

⑥ IC803	TEXT SW OFF	TEXT SW ON
1	2.84V	
2	2.84V	
3	2.84V	
4	2.84V	
5	0V	
6	2.8V	
7	0V	
8	2.8V	
9	2.87V	
10	2.86V	
11	4.2V / 2.7V	
12	2.85V	
13	4.8V / 0V	
14	4.9V	
15		
16		

⑦ IC804	TEXT SW OFF	TEXT SW ON
1	4.2V	2.8V
2	3V	
3	4.2V	2.8V
4	3V	
5	4.2V	2.8V
6	3V	
7	0V	
8	2.9V	
9	4.2V	2.8V
10	2.9V	
11	4.2V	2.8V
12	2.9V	
13	4.2V	2.8V
14	4.9V	

15.850kHz	27kHz	30.4kHz
15.850kHz	27kHz	23.4kV
22kHz	27kHz	23.4kV
30.4kHz	27kHz	23.4kV

NOTES

1. RESISTOR VALUES ARE IN Ω (OHM) K = 1,000Ω M = 1,000,000Ω
2. ALL RESISTORS ARE 1/6WATT EXCEPT WHERE OTHERWISE INDICATED.
3. CAPACITOR VALUES ARE IN μF UNLESS OTHERWISE INDICATED. P = PF
4. ALL CAPACITORS ARE 50VOLTS EXCEPT WHERE OTHERVISE INDICATED.
5. VOLTAGES AND WAVEFORMS ARE MEASURED UNDER THE INVERTED "H" CHARACTER SIGNALS. THE CONTRST CONTROL IS MAXIMUM. THE BRIGHTNESS CONTROL IS MINIMUM AND ALL OTHER CONTROLS ARE NORMAL OPERATION.
6. VOLTAGES AND WAVEFORMS ARE MEASURED UNDER THE FOLLOWING SYNC. AND VIDEO. EXCEPT WHERE OTHERVISE INDICATED.
   SYNC : HORIZONTAL RATE = 22.8KHz . SEPARATE SYNC . TTL LEVEL . POSITIVE
   VIDEO TTL LEVEL . POSITIVE
7. Ⓗ----- HORIZONTAL RATE. Ⓥ---- VERTICAL RATE.

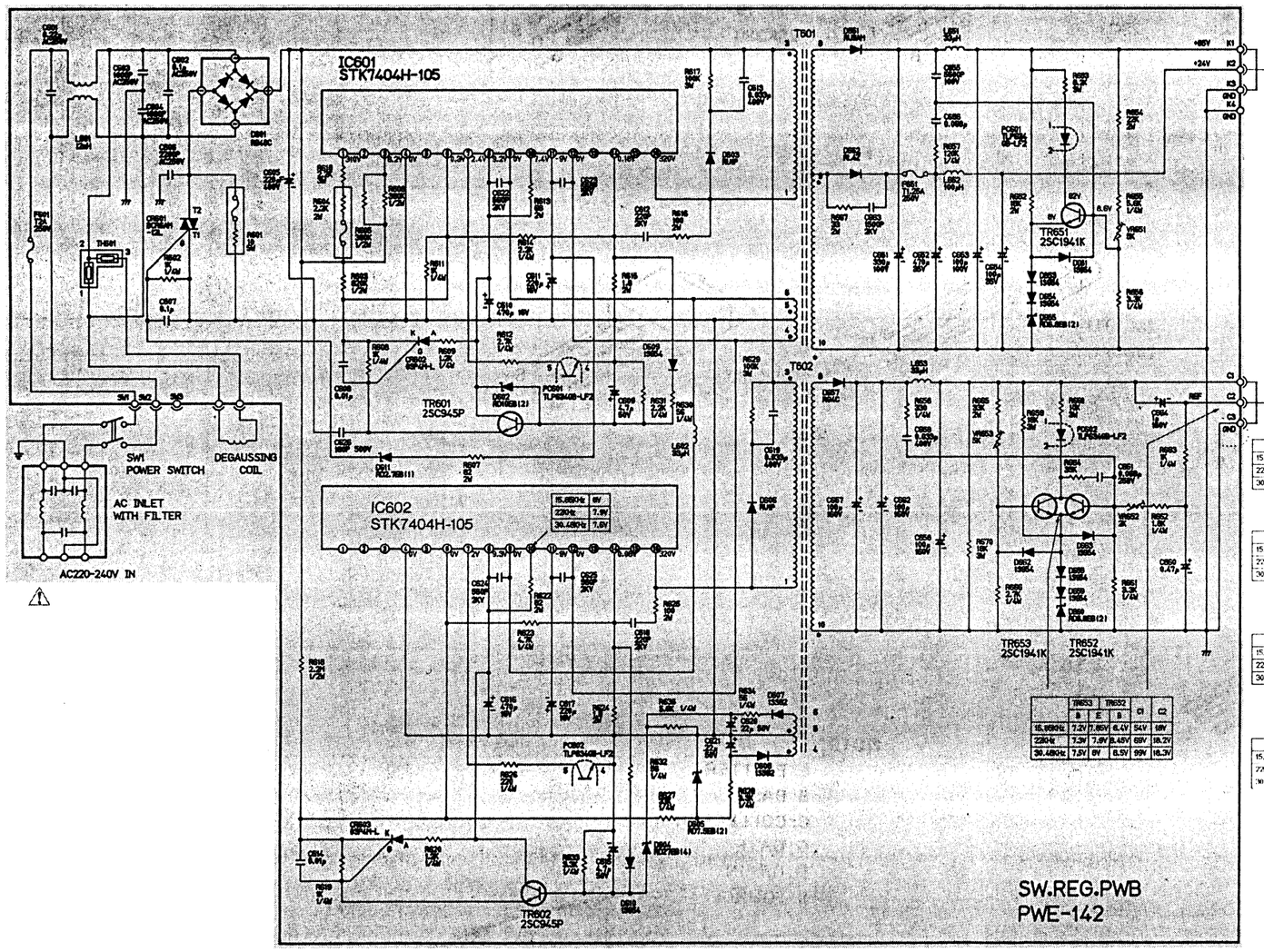
WARNING

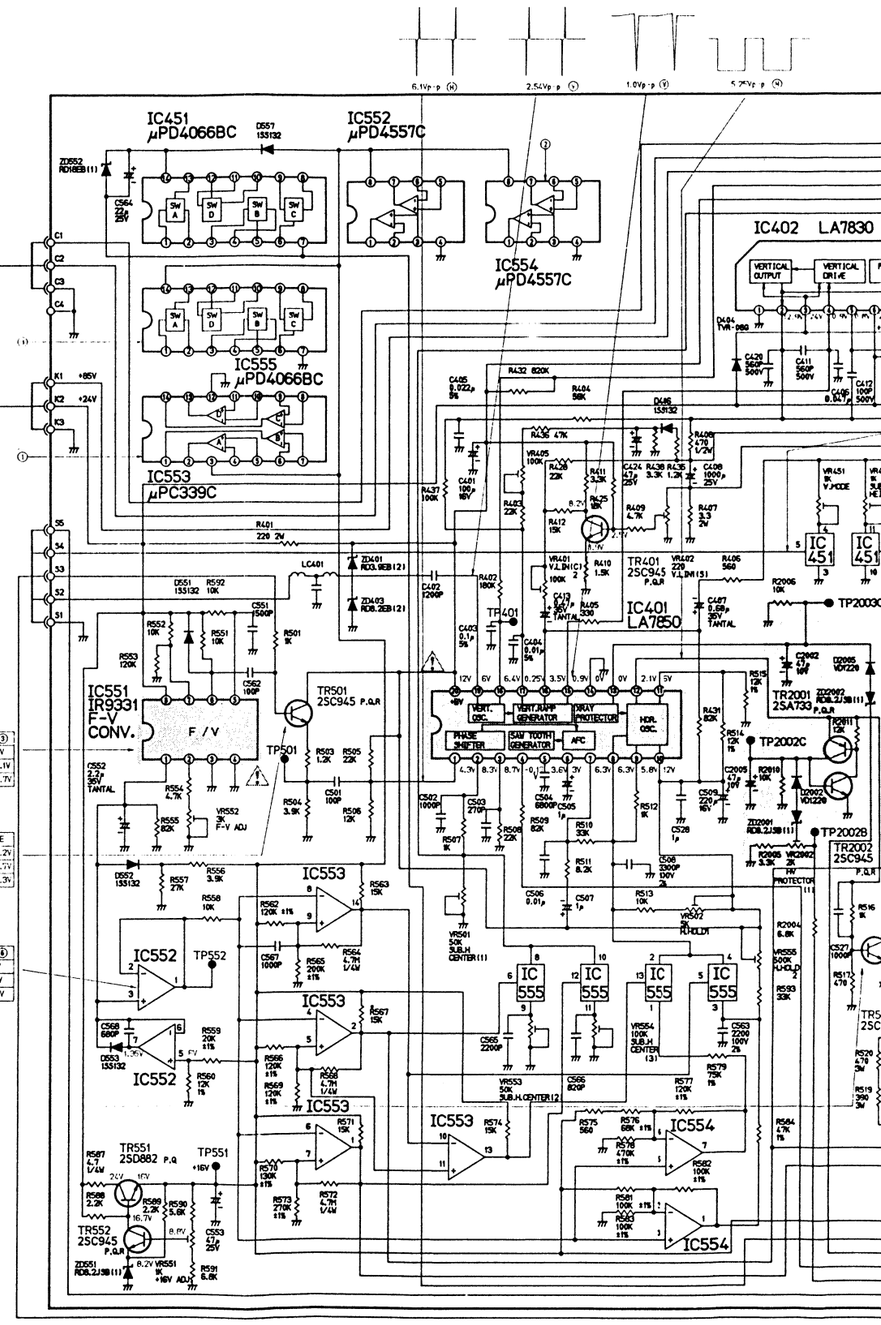
REPLACEMENT PARTS WHICH HAVE SPECIAL SAFETY CHARACTERISTICS ARE IDENTIFIED BY ⚠ SHADING ON THE SCHEMATICS. REPLACE THESE CRITICAL COMPONENTS WITH RECOMMENDED REPLACEMENT PARTS.
DON'T DEGRADE THE SAFETY OF THE SET THROUGH IMPROPER SERVICING.

CONTROL (S) MARKED ✱ IS PERMANENTLY FROZEN.
DO NOT ATTEMPT TO DEFEAT OR IMPROPERLY REPLACE.

RAM IS FUNDAMENTAL AND SUBJECT TO CHANGE.

MODEL JC-1401P3E/EE/R
SCHEMATIC DIAGRAM





	①	②	③
15.850Hz	6.1V	1.9V	3V
22kHz	8.4V	1.86V	4.1V
30.48kHz	11.5V	1.87V	5.7V

	B	C	E
15.850Hz	8.7V	12V	8.2V
22kHz	8.1V	12V	7.7V
30.48kHz	7.6V	12V	7.3V

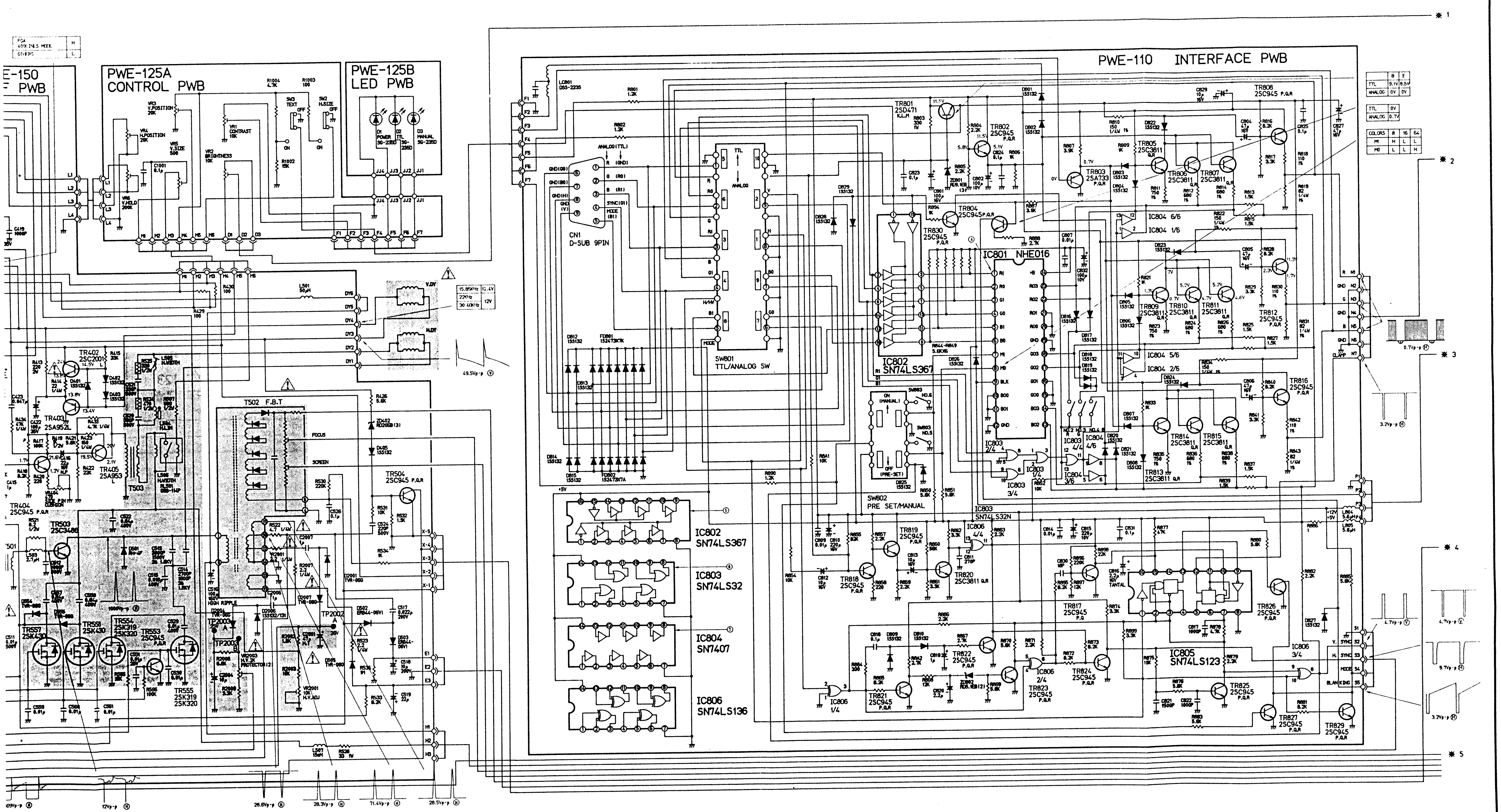
	①②	③④
15.850Hz	6.4V	6.1V
22kHz	8.9V	8.3V
30.48kHz	12.2V	11.5V

	B	C
15.850Hz	0.32V	55V
22kHz	0.31V	47V
30.48kHz	0.30V	44V

	TR653		TR652		C1	C2
	B	E	B	E		
15.850Hz	7.2V	7.85V	8.4V	154V	68V	
22kHz	7.3V	7.9V	8.45V	68V	16.2V	
30.48kHz	7.5V	8V	8.5V	99V	16.3V	

THIS SCHEMATIC DIAGRAM IS FUNDAMENTAL AND SUBJECT TO CHANGE

RUN NO.1


E-150
PWB
PWE-125A
CONTROL PWB
PWE-125B
LED PWB
PWE-110 INTERFACE PWB
CN1
D-SUB 9PIN
SW801
TTL/ANALOG SW
IC801 NHE016
IC802 SN74LS367
IC803 SN74LS32
IC804 SN7407
IC805 SN74LS123
IC806 SN74LS136
SW802
PRE SET/MANUAL
T502 F.B.T
FOCUS
SCREEN
TR402 2SC2001
TR403 2SA952L
TR404 2SC945
TR405 2SA953
TR503 2SC3486
TR504 2SC945
TR553 2SC945
TR554 2SK319 2SK320
TR555 2SK319 2SK320
TR557 2SK430
TR558 2SK430
TR801 2SD471
TR802 2SC945
TR803 2SA733
TR804 2SC945
TR805 2SC3811
TR806 2SC3811
TR807 2SC3811
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TR815 2SC3811
TR816 2SC945
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TR818 2SC945
TR819 2SC945
TR820 2SC3811
TR821 2SC945
TR822 2SC945
TR823 2SC945
TR824 2SC945
TR825 2SC945
TR826 2SC945
TR827 2SC945
TR829 2SC945
TR830 2SC945
TP2002
TP2003
49.5Vp-p
0.7Vp-p
3.2Vp-p
4.7Vp-p
9.7Vp-p
28.6Vp-p
28.3Vp-p
71.4Vp-p
28.5Vp-p
12Vp-p
※ 1
※ 2
※ 3
※ 4
※ 5

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PWE-150
DEF PWB

PWE-125A
CONTROL PWB

PWE-125B
LED PWB

IC451
μPD4066BC

IC552
μPD4557C

IC554
μPD4557C

IC555
μPD4066BC

IC553
μPC339C

IC402 LA7830 V.OUT

IC401
LA7850

IC551
IR9331
F-V
CONV.

F/V

TR652
2SC1941K

V.REG.PWB
VE-142

CN1
D-SUB 9PIN

SW801
TTL/ANALOG SW

IC802
SN74LS367

IC803
SN74LS32

IC804
SN7407

IC806
SN74LS136

T502 F.B.T

T503

FOCUS

SCREEN

HIGH RIPPLE PROTECTION

HV PROTECTION

PGA 400LINES MODE	H
OTHERS	L

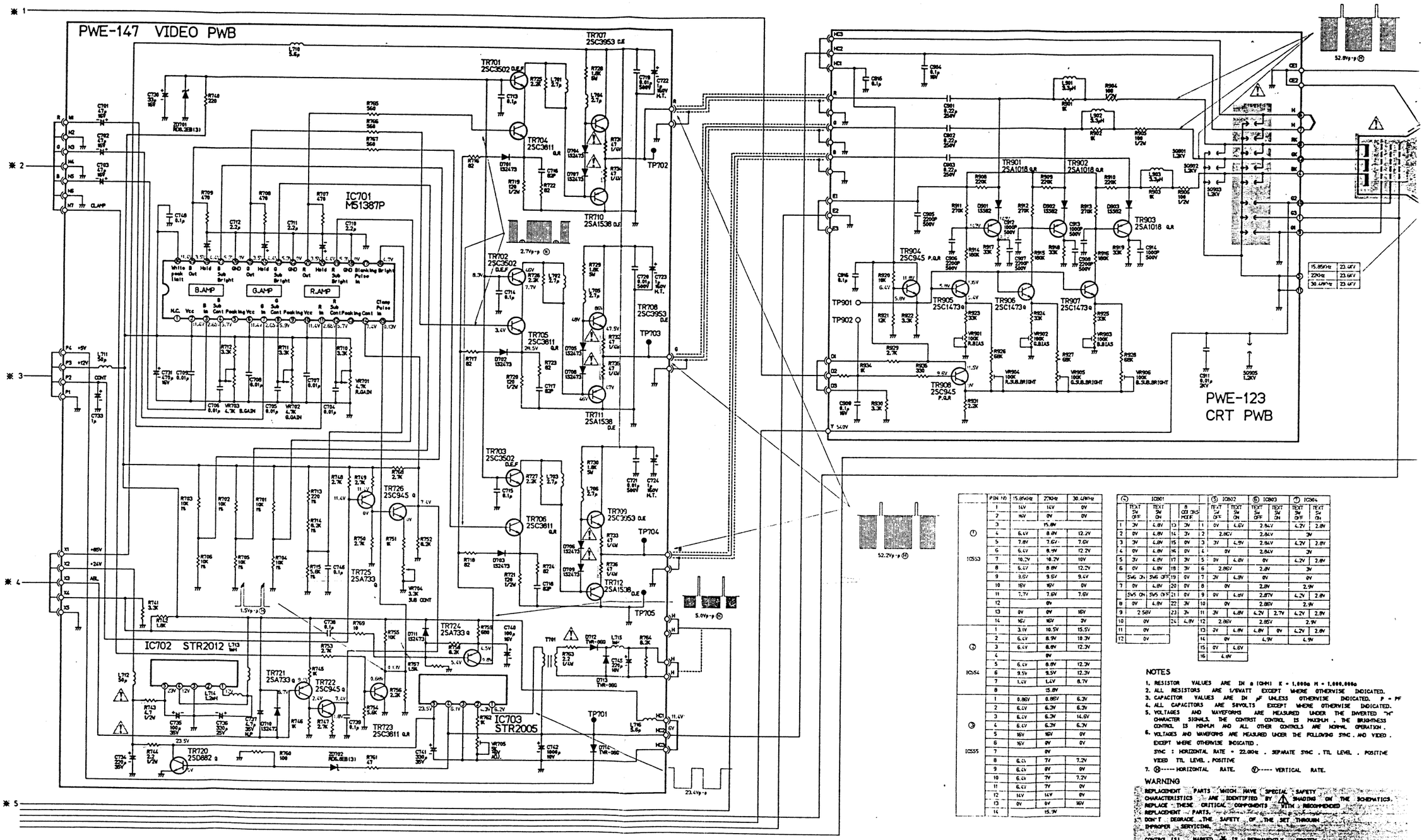
	①	②	③
15.85KHz	6.1V	1.9V	3V
22KHz	8.4V	1.86V	4.1V
30.48KHz	11.5V	1.87V	5.7V

	B	C	E
15.85KHz	8.7V	12V	8.2V
22KHz	8.1V	12V	7.5V
30.48KHz	7.6V	12V	7.3V

	① ②	③ ④
15.85KHz	6.4V	6.1V
22KHz	8.9V	8.3V
30.48KHz	12.2V	11.5V

	B	C
15.85KHz	0.32V	55V
22KHz	0.37V	47V
30.48KHz	0.38V	44V

	TR553		TR552		
	B	E	B	C1	C2
15.85KHz	7.2V	7.65V	8.4V	54V	18V
22KHz	7.3V	7.9V	8.48V	86V	18.2V
30.48KHz	7.3V	8V	8.5V	99V	18.3V



	PIN NO	15.85KHz	22KHz	30.48KHz
IC553	1	14V	14V	0V
	2	16V	0V	0V
	3		15.8V	
	4	6.4V	8.8V	12.2V
	5	7.8V	7.6V	7.6V
	6	6.4V	8.9V	12.2V
	7	10.2V	10.2V	10V
	8	6.4V	8.8V	12.2V
	9	3.6V	9.5V	9.4V
	10	16V	16V	0V
	11	7.7V	7.6V	7.6V
	12		0V	
	13	0V	0V	16V
	14	16V	16V	3V
IC554	1	3.1V	10.5V	15.5V
	2	6.4V	8.9V	10.3V
	3	6.4V	8.8V	12.3V
	4		0V	
	5	6.4V	8.8V	12.3V
	6	9.5V	9.5V	12.3V
	7	1.4V	1.4V	8.7V
	8		15.8V	
IC555	1	8.86V	8.86V	6.3V
	2	6.4V	6.3V	6.3V
	3	6.4V	6.3V	14.6V
	4	6.4V	6.3V	6.3V
	5	16V	16V	0V
	6	16V	0V	0V
	7		0V	
	8	6.4V	7V	7.2V
	9	6.4V	0V	0V
	10	6.4V	7V	7.2V
	11	6.4V	7V	0V
	12	16V	16V	0V
	13	0V	0V	16V
	14		15.9V	

④ IC801					⑤ IC802		⑥ IC803		⑦ IC804	
TEXT SW OFF	TEXT SW ON		B CCI SYS MODE		TEXT SW OFF	TEXT SW ON	TEXT SW OFF	TEXT SW ON	TEXT SW OFF	TEXT SW ON
1 3V	4.8V	13 3V	1	0V	4.6V	2.8V		4.2V	2.8V	
2 0V	4.8V	14 3V	2	2.8V		2.8V		3V		
3 3V	4.8V	15 0V	3	3V	4.5V	2.8V		4.2V	2.8V	
4 0V	4.8V	16 0V	4	0V		2.8V		3V		
5 3V	4.8V	17 3V	5	0V	4.8V	0V		4.2V	2.8V	
6 0V	4.8V	18 3V	6	2.8V		2.8V		3V		
SW6 ON	SW6 OFF	19 0V	7	3V	4.3V	0V		0V		
7 0V	4.8V	20 0V	8	0V		2.8V		2.9V		
SW5 ON	SW5 OFF	21 0V	9	0V	4.6V	2.87V		4.2V	2.8V	
8 0V	4.8V	22 3V	10	0V		2.86V		2.9V		
9 2.58V		23 3V	11	3V	4.8V	4.2V	2.7V	4.2V	2.8V	
10 0V		24 4.8V	12	2.86V		2.85V		2.9V		
11 0V			13	3V	4.8V	4.8V	0V	4.2V	2.8V	
12 0V			14	0V		4.9V		4.9V		
			15	0V	4.6V					
			16	4.8V						

NOTES

1. RESISTOR VALUES ARE IN Ω (OHM) K = 1,000Ω M = 1,000,000Ω
2. ALL RESISTORS ARE 1/6WATT EXCEPT WHERE OTHERWISE INDICATED.
3. CAPACITOR VALUES ARE IN μF UNLESS OTHERWISE INDICATED. P = PF
4. ALL CAPACITORS ARE 50VOLTS EXCEPT WHERE OTHERWISE INDICATED.
5. VOLTAGES AND WAVEFORMS ARE MEASURED UNDER THE INVERTED "H" CHARACTER SIGNALS. THE CONTRST CONTROL IS MAXIMUM . THE BRIGHTNESS CONTROL IS MINIMUM AND ALL OTHER CONTROLS ARE NORMAL OPERATION .
6. VOLTAGES AND WAVEFORMS ARE MEASURED UNDER THE FOLLOWING SYNC . AND VIDEO . EXCEPT WHERE OTHERWISE INDICATED .
   SYNC : HORIZONTAL RATE = 22.0KHz . SEPARATE SYNC . TTL LEVEL . POSITIVE
   VIDEO TTL LEVEL . POSITIVE
7. Ⓗ----- HORIZONTAL RATE. Ⓥ---- VERTICAL RATE.

WARNING

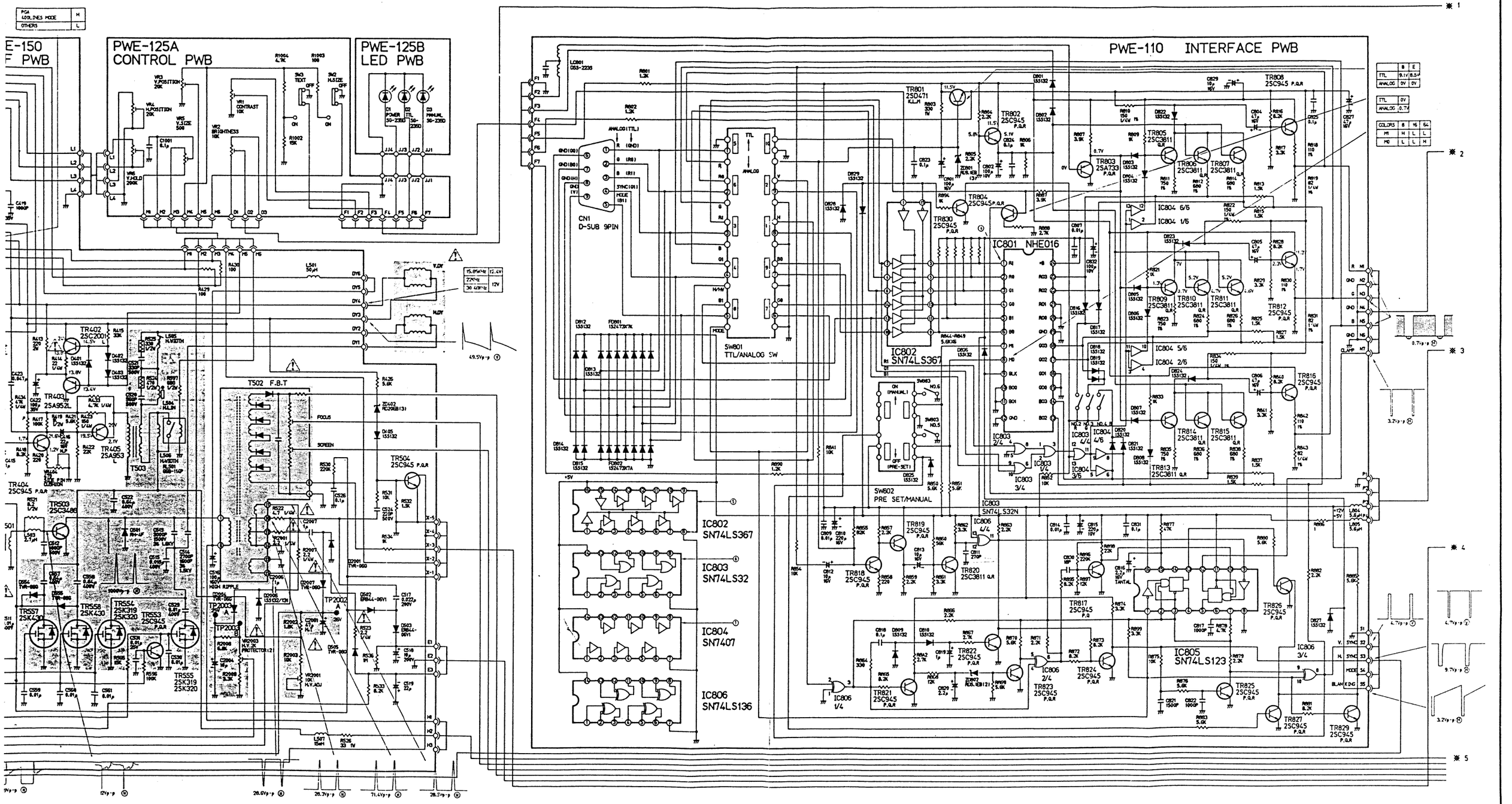
REPLACEMENT PARTS WHICH HAVE SPECIAL SAFETY CHARACTERISTICS ARE IDENTIFIED BY ⚠ SHADING ON THE SCHEMATICS. REPLACE THESE CRITICAL COMPONENTS WITH RECOMMENDED REPLACEMENT PARTS. DON'T DEGRADE THE SAFETY OF THE SET THROUGH IMPROPER SERVICING.

CONTROL ISI MARKED ✱ IS PERMANENTLY FROZEN. DO NOT ATTEMPT TO DEFEAT OR IMPROPERLY REPLACE.

THIS SCHEMATIC DIAGRAM IS FUNDAMENTAL AND SUBJECT TO CHANGE.

SAVE THIS SCHEMATIC DIAGRAM FOR LATER SERVICE.

RUN NO.1



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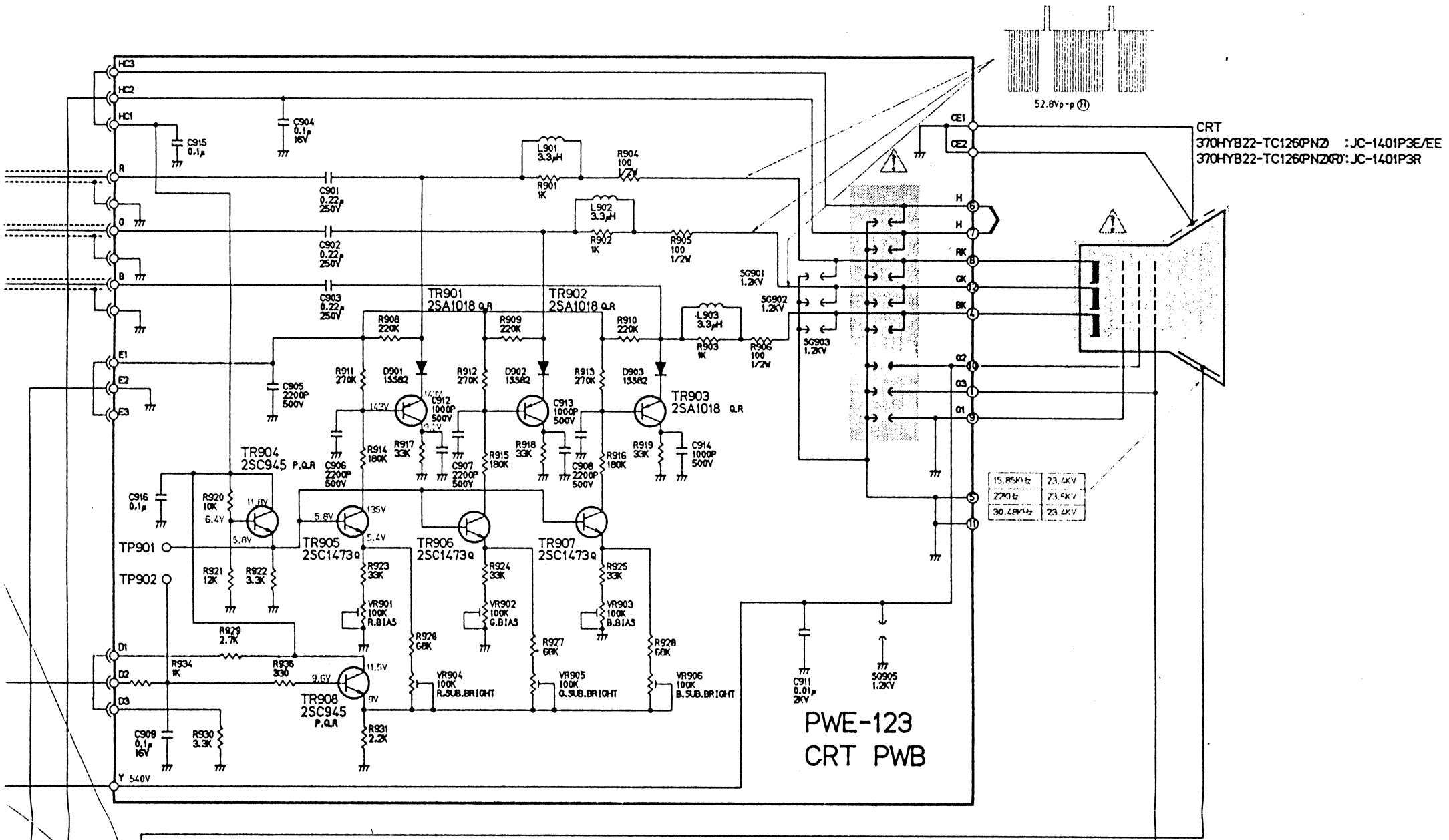
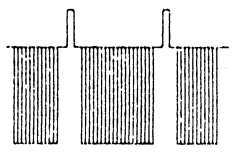


15.85KHz	23.4KV
22KHz	23.6KV
30.48KHz	23.4KV



	PIN NO	15.85KHz	22KHz	30.4KHz
IC553 ①	1	14V	14V	0V
	2	16V	0V	0V
	3	15.8V		
	4	6.4V	8.8V	12.2V
	5	7.8V	7.6V	7.6V
	6	6.4V	8.8V	12.2V
	7	10.2V	10.2V	10V
	8	6.4V	8.8V	12.2V
	9	9.6V	9.6V	9.4V
	10	16V	16V	0V
	11	7.7V	7.6V	7.6V
	12	0V		
	13	0V	0V	16V
	14	16V	16V	0V
IC554 ②	1	3.1V	10.5V	15.5V
	2	6.4V	8.9V	10.3V
	3	6.4V	8.8V	12.3V
	4	0V		
	5	6.4V	8.8V	12.3V
	6	9.5V	9.5V	12.3V
	7	1.4V	1.4V	8.7V
	8	15.8V		
IC555 ③	1	0.06V	0.06V	6.7V
	2	6.4V	6.7V	6.7V
	3	6.4V	6.7V	14.6V
	4	6.4V	6.7V	6.7V
	5	16V	16V	0V
	6	16V	0V	0V
	7	0V		
	8	6.4V	7V	7.2V
	9	6.4V	0V	0V
	10	6.4V	7V	7.2V
	11	6.4V	7V	0V
	12	14V	14V	0V
	13	0V	0V	16V
	14	15.9V		

④ IC801						⑤ IC802			⑥ IC803			⑦ IC804		
	TEXT SW OFF	TEXT SW ON		8 COLORS MODE		TEXT SW OFF	TEXT SW ON		TEXT SW OFF	TEXT SW ON		TEXT SW OFF	TEXT SW ON	
1	3V	4.8V	13	3V	1	0V	4.6V		2.84V			4.2V	2.8V	
2	0V	4.8V	14	3V	2	2.86V			2.84V			3V		
3	3V	4.8V	15	0V	3	3V	4.8V		2.84V			4.2V	2.8V	
4	0V	4.8V	16	0V	4	0V			2.84V			3V		
5	3V	4.8V	17	3V	5	0V	4.8V		0V			4.2V	2.8V	
6	0V	4.8V	18	3V	6	2.86V			2.8V			3V		
	SW5 ON	SW5 OFF	19	0V	7	3V	4.8V		0V			0V		
7	0V	4.8V	20	0V	8	0V			2.8V			2.9V		
	SW5 ON	SW5 OFF	21	0V	9	0V	4.8V		2.87V			4.2V	2.8V	
8	0V	4.8V	22	3V	10	0V			2.86V			2.9V		
9	2.58V		23	3V	11	3V	4.8V		4.2V	2.7V		4.2V	2.8V	
10	0V		24	4.8V	12	2.86V			2.85V			2.9V		
11	0V				13	0V	4.8V		4.8V	0V		4.2V	2.8V	
12	0V				14	0V			4.9V			4.9V		
					15	0V	4.6V							
					16	4.8V								

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   VIDEO TTL LEVEL . POSITIVE
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